DRAFT
Kentucky Ruffed Grouse and Young Forest Strategic Plan 2016-2026

Photo Credit: Joe Lacefield

Kentucky Department of Fish and Wildlife Resources
1 Sportsman's Lane
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Prepared by:
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EXECUTIVE SUMMARY

Kentucky grouse hunters have long voiced their concerns to the Kentucky Department of Fish and Wildlife Resources (KDFWR) about declining grouse populations, and their hunting logs over the years have reflected such a trend. The Commonwealth is not alone, as the same is true in surrounding Appalachian states and even in some northern states where grouse were once plentiful. The primary culprit? Habitat loss. Predators, weather, and disease play a part in grouse population dynamics, but the days of high grouse densities in Appalachia were a product of land uses that caused continual forest disturbance across the landscape. Timber and firewood cutting, farm fields reverting to young forest, and reclaimed surface mines all provided abundant grouse enjoyed by past generations of hunters.

KDFWR land managers have been working to implement forest management for grouse and other species, but efforts to date have been limited by factors including funding, staffing levels and land management constraints. Additionally, most potential grouse habitat in the state is controlled by (1) federal agencies whose ability to manage for grouse has been limited in recent decades and (2) private landowners whose management decisions are subject to fluctuating market conditions and their management values.

The KDFWR is embarking on an ambitious effort aimed at turning the tide for the ruffed grouse, a noble gamebird unmatched for its wing-shooting challenge, and no less than a "canary in the coal mine" indicator of loss of early successional forest conditions affecting many other species of conservation concern. The *Ruffed Grouse and Young Forest Initiative* will serve as the focus for KDFWR and partners to achieve restoration of ruffed grouse and associated species in Kentucky.

The 10-year plan presented below will serve as a keystone for the initiative, strengthening current KDFWR efforts by prioritizing limited resources to offer the best possible "bang for our birds." The plan centers on strategic habitat improvement. We will get to work managing grouse habitat on focal Wildlife Management Areas, then we will take our initiative to the Daniel Boone National Forest (DBNF) and private lands. Over the long-term, we will work with the forest products industry to promote sound management of local forest resources as a means to revitalize local communities. Such work will not be easy and will not happen overnight, but to effectively conserve ruffed grouse we must seek collaboration and partnerships that produce needed young forest habitat in ways that benefit local economies.

Why a 10-year timeframe? First, it's symbolic, as this is the approximate amount of time following a stand-initiating event – such as heavy logging, old-field abandonment, ice storms, and tornadoes – that young forests grow to an optimal stage for ruffed grouse. Second, 10 years is a reasonable time span for KDFWR and partners at federal, state, and local levels to implement a strategic grouse management plan and expect to observe a grouse increase.

Many hunters have asked for changes to the grouse season, including reducing season length and bag limit. We will investigate various hunting season frameworks to maximize our efforts and to control hunting pressure on focal areas in order to promote high quality, memorable hunting experiences.

The plan will improve monitoring needed to gauge success of our efforts. We will redesign our surveys to track short-term (<10 years) response of grouse to focal area habitat improvement and long-term (>10 years) population trends. Similarly, we hope to develop research projects that evaluate habitat quantity and quality resulting from forest management, identify approaches to overcoming social barriers to grouse restoration, conduct disease surveillance, and others.

The current list of strategies is not exhaustive. This draft is open for comment by staff, partners, and the public. The plan is intended to be a "living process" that embraces and embodies Adaptive Management, where management plans and actions adapt as conditions and factors affecting the ruffed grouse resource change over time. The plan represents an honest attempt to apply scientific principles to manage grouse habitats and populations while accounting for the human dimensions that also influence decisions.

The Ruffed Grouse Strategic Plan constitutes nothing less than a formal dedication to grouse restoration in the Commonwealth. As Commissioner Gregory Johnson has stated, "We are thinking big, we will be innovative and we hope to be successful." KDFWR asks for support along the way.

Photo Credit: Zak Danks

ACKNOWLEDGMENTS

Many individuals provided input and support valuable to the development of this draft of the *Kentucky Ruffed Grouse and Young Forest Strategic Plan 2016-2026*, including:

Grouse hunters and other members of the public who attended public meetings and who responded to online surveys about grouse restoration.

Colleagues:
Kentucky Department of Fish and Wildlife Resources:
(Leadership) Commissioner Greg Johnson; Deputy Commissioner Dr. Karen Waldrop; Director Steve Beam; Assistant Directors Dan Figert, Chris Garland, Ben Robinson, Brian Clark

(Wildlife Division Programs) Dr. Danna Baxley, John Morgan, Sunni Carr, Gabe Jenkins, Will Bowling, Keith Wethington, Gary Sprandel, Naomi Wilson, Dr. Iga Stasiak

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USDA Natural Resources Conservation Service: Casey Shrader, Tony Nott

Ruffed Grouse Society: Linda Ordiway

Appalachian Mountains Joint Venture: Todd Fearer

Kentucky Chapter of The Nature Conservancy: Jeff Sole

REQUEST FOR INPUT ON DRAFT PLAN

This draft of the plan will be posted on the KDFWR website (www.fw.ky.gov) from June 10th through July 8th, 2016). Public comments are welcomed and encouraged during this time. Following the close of the draft plan comment period, KDFWR will hold public meetings to provide further opportunity for public comment.
Please email comments to:

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VISION

In 10 years, Kentucky will have:

- Demonstrated how to increase grouse populations locally through habitat improvement on focus areas.
- Monitored how grouse populations respond to habitat management and a large-scale natural disturbance (the 2012 tornado).
- Forged partnerships to increase opportunities for grouse and young forest habitat improvement on state, federal, and private lands in eastern Kentucky.
- Demonstrated how grouse habitat work benefits a suite of other species.
- Promoted grouse and young forest habitat as an umbrella to improve the status of other declining early-successional species and to reverse oak decline in Appalachian forests.
- Stimulated forest industry as the mechanism for young forest habitat creation across the region.
- Managed invasive plant species aggressively.
- Fostered multi-state momentum for grouse and young forests to turn the tide nationally.

If successful in these endeavors, we will have set in motion long-term:

- Conservation of the ruffed grouse.
- Preservation of our grouse hunting tradition.
- Memorable experiences for Kentuckians and our guests.

"I have read many definitions of what is a conservationist,

and written not a few myself,

but I suspect that the best one is written not with a pen,

but with an axe."

– Aldo Leopold, A Sand County Almanac (1949).

INTRODUCTION

Plan Purpose

The mission of the Kentucky Department of Fish and Wildlife Resources (KDFWR) is to conserve and enhance fish and wildlife resources and provide opportunity for hunting, fishing, trapping, boating and other wildlife-related activities. The ruffed grouse (*Bonasa umbellus*) is a popular upland gamebird resident in the eastern third of the Commonwealth. Grouse populations have declined here and in other Appalachian states for the past two to three decades, reducing public opportunities to enjoy this resource. In support of its mission and in response to the long-term decline of grouse populations, grouse habitat, and grouse hunting, KDFWR is launching a *Ruffed Grouse and Young Forest Strategic Initiative*.

The initiative seeks to restore grouse in Kentucky, considering all potential factors related to their decline, but focusing on the most limiting factor: habitat. Habitat improvement will require increasing the amount of young forest (i.e., early successional or early seral age-classes and stand structure) and oak reproduction (i.e., advance regeneration) through on-going, sustainable forest management. In the short term, the initiative will (1) build on KDFWR regional efforts toward forest management on Wildlife Management Areas (WMAs) and (2) support partners' efforts to sustainably manage forests for multiple uses on state, federal, and private land. Long term, the initiative will work to (1) increase public awareness of the need for active management to promote healthy forests and provide habitat for a suite of species, and (2) stimulate forest industry to provide the engine for grouse management across the eastern Kentucky region.

The *Kentucky Ruffed Grouse and Young Forest Strategic Plan 2016-2026* will guide this initiative over the next 10 years. The plan describes the challenges and opportunities surrounding grouse restoration, and presents goals and strategies to pursue. Successfully implementing the plan will require commitment, patience, partnerships, and financial resources to fund the people and work needed to achieve goals. Partnerships with federal, state, local, nonprofit, and forest industry sectors will be needed to overcome current barriers impeding the forest management so critical to conserving grouse and other young forest wildlife for future generations.

Plan Development

The approach used here for grouse draws heavily on the format and general approach of the Kentucky quail plan, *Road to Recovery: The Blueprint for Restoring the Northern Bobwhite in Kentucky* (Morgan and Robinson 2008, 2015). That plan prioritized management, monitoring, and research on bobwhite quail in focal areas of the state, which laid the groundwork for what has become a nationally recognized restoration effort (National Bobwhite Conservation Initiative 2014).

In addition, this plan is intended to "step-down" implementation of the Ruffed Grouse Conservation Plan (Dessecker et al. 2006), a range-wide plan covering the species' entire range in North America. That plan set 1980, with grouse population and habitat conditions at the time, as the benchmark year from which subsequent declines could be measured and as the target toward which future management intervention, in all states and provinces, should strive. The

Kentucky Grouse and Young Forest Initiative embraces the key recommendations of the plan. However, at this point we have not adopted the habitat and population goals as targets for our success; we simply feel restoration on such a scale is unattainable in the time allotted for this plan and in the national plan (2025). Rather, we simply hope to achieve a two-fold increase in grouse populations on localized "focal areas" where we intend to allocate our resources in the short term.

Public input was, and continues to be, sought for the development of the *Ruffed Grouse and Young Forest Strategic Plan 2016-2026*. As the 2014-2015 Kentucky grouse season drew to a close, KDFWR held public meetings about grouse in Morehead, Paintsville, and Corbin. The purpose of these meetings was to announce KDFWR's intent to improve grouse management and to gather public input. A subsequent survey accessible on the KDFWR website offered an additional opportunity for public comment. (A summary of public comments is included as an appendix.) Initial plan efforts were organized by an interim grouse team composed of Wildlife Division staff. Staff input was sought at meetings with KDFWR Northeast and Southeast Regional staff.

Plan Focus

Habitat improvement is the focus of the plan. Simply put, this means: *managing forests on focal areas, with partners, to provide habitat of adequate quality, size, and duration to give local grouse populations the chance to increase to recreational levels not seen in a generation*.

- *Forest management* includes commercial timber harvests and noncommercial habitat treatments aimed at providing what we know from experience and research to be most important to grouse –dense, young forest cover in close proximity to mature, mast-producing trees.
- *Focal areas* may include Wildlife Management Areas (WMAs), state forests, the Daniel Boone National Forest, and private lands.
- *Partners* will include federal, state, and local agencies, corporations, and private individuals who own land, but also organizations and individuals we need to support our effort.
- *Quality* means a "mosaic" of forest growth stages, from young to old, needed by grouse throughout their annual life cycle, arranged to provide food and cover close together within forest stands.
- *Size* means the thousands of managed acres needed to support recreational (i.e., huntable) densities of grouse.
- *Duration* means periodic cuts and improvements within forest management units necessary to maintain the grouse habitat mosaic over the long-term, which in turn means decades of sustainable forest management based on rotation lengths of approximately 80 to 120 years.

STRATEGIC PLAN GOALS: GROUSE MANAGEMENT OPPORTUNITIES

Goal 1
Increase grouse populations in focal areas and surrounding landscapes.

Goal 2
Increase grouse populations across eastern Kentucky.

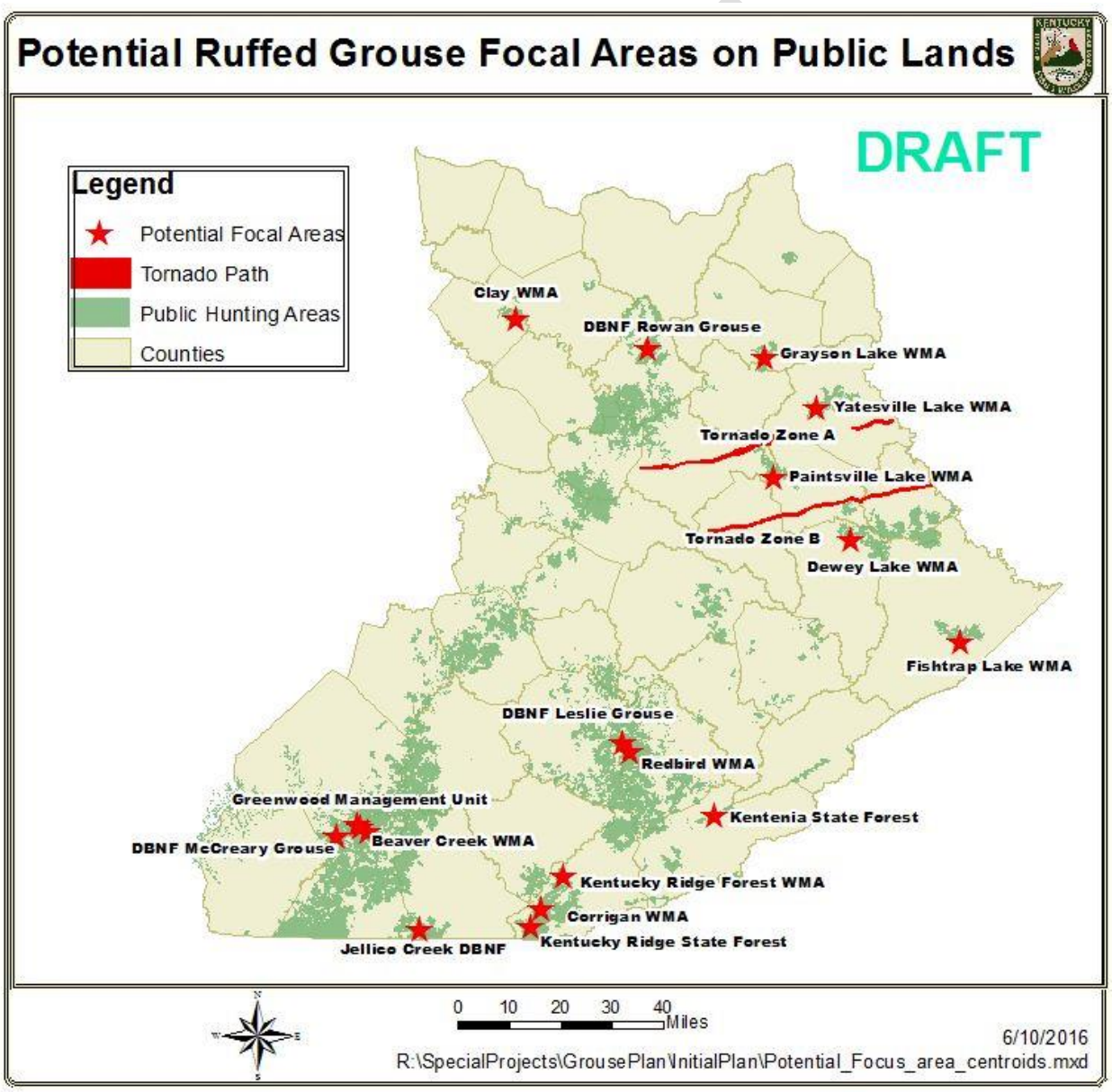

Figure 1. Map of potential grouse focal areas on public land in eastern Kentucky.

GOAL 1:
Increase grouse populations in focal areas and surrounding landscapes.

Challenge 1:
Prioritize grouse management on focal Wildlife Management Areas (WMAs).

A strategic approach to grouse restoration must involve focal WMAs where available resources can be applied efficiently and immediately by KDFWR staff. Focal areas will be land management units where the creation, enhancement and maintenance of young forest habitat for grouse is a top management priority.

Strategies:

1. Designate grouse focal areas on at least one Wildlife Management Areas (WMAs) per Region (Northeast and Southeast).
2. Direct currently available grouse program funds to focal areas to support immediate planning and implementation of habitat work, including purchasing equipment and supplies, hiring or contracting professional foresters to cruise timber and run timber sales, and hiring interim technicians to conduct management activities.
3. Develop a system for prioritizing fund allocation as multiple focal WMAs get rolling and necessarily compete for funds.
4. Develop mechanisms to generate funding for habitat projects (e.g., similar to quail license plate sales).
5. Promote even-aged forest management techniques to meet the seasonal habitat needs of Appalachian ruffed grouse, consistent with the recommendations of the national Ruffed Grouse Conservation Plan (AWFA 2006) and with the Appalachian Cooperative Grouse Research Project (ACGRP 2011).
6. Promote prescribed fire to improve understory conditions for grouse, particularly brood-rearing habitat and in conjunction with shelterwood and clearcut treatments to improve oak regeneration.
7. For focal WMAs owned by the U. S. Army Corps of Engineers (USACE) (e.g., Dewey Lake, Yatesville Lake, Grayson Lake, Paintsville Lake), garner USACE support and approval to manage forests using commercial timber harvest as the tool to improve habitat for declining species (grouse, young-forest songbirds) on a scale large enough (100s-1000s of acres) to improve population viability and recreational opportunities (hunting, birdwatching).
8. For focal WMAs co-owned with the Kentucky Division of Forestry (KDF) (e.g., Kentucky Ridge WMA and State Forest), garner KDF support and approval to increase commercial timber harvest, and to incorporate other grouse-specific habitat prescriptions where appropriate.
9. Explore means of assisting KDF foresters to assist with forest management planning and implementation on co-owned Kentucky Ridge State WMA and State Forest (e.g., hiring staff, co-funding contracted foresters).
10. Develop forest inventories (if not already completed) for each focal area to delineate and characterize forest stands (e.g., species composition, age class, and merchantability) for use by WMA managers in writing forest management plans and prioritizing projects.

Professional foresters will be contracted and/or hired to produce forest inventories in a thorough, timely manner.

11. Develop forest management plans for each focal WMA that guides habitat improvement according to specific habitat prescriptions for grouse (e.g., commercial and non-commercial timber treatments, maintenance of forest openings, roads/trails, rights-of-way) that coordinate with needs of and treatments for other species (e.g., bats). WMA managers (public lands biologists) will develop site-specific grouse plans based on forest inventories and with input from foresters, regional coordinators, and program coordinators.
12. Pursue focal area opportunities on large privately-owned properties (e.g., timber company lands), including public hunting, population monitoring, and integration of grouse habitat prescriptions with primary timber objectives.
13. Implement habitat projects, including on-going efforts and new work once inventories and management plans are available.
14. Conduct regional work weeks where KDFWR crews of staff devote blocks of time to assist with on-the-ground implementation.
15. Be vigiliant in monitoring for and responding to problematic invasive plant species following forest management.

Assessment:
Implement all strategies in 10 years.

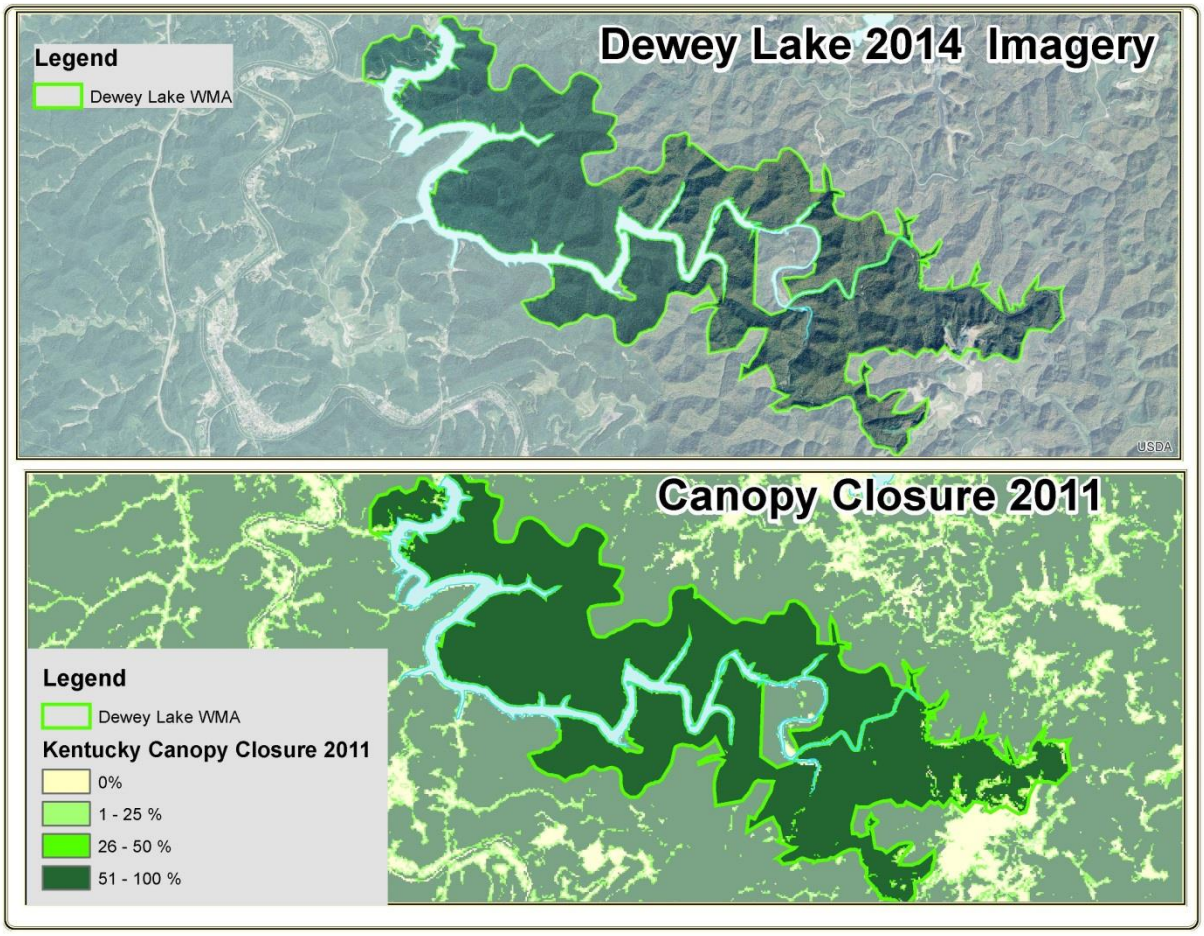

Figure 2. Dewey Lake Wildlife Management Area (WMA), owned by the U. S. Army Corps of Engineers, managed by the Kentucky Department of Fish and Wildlife Resources. The area contains little quality grouse habitat at present due to a predominately mature, closed canopy forest. However, as part of a large block for forested cover with potential to support managed timber harvests, Dewey is a potential focal WMA.

Challenge 2: Facilitate grouse habitat management on the Daniel Boone National Forest (DBNF).

The DBNF Land and Resource Management Plan (i.e., forest plan) includes 3 designated Grouse Emphasis Areas (GEAs) in the Cumberland, Stearns, and Redbird Rangers Districts. Also, the FS has planned or is planning forest management for multiple objectives in Vegetation Management Units (VMUs) comprising thousands of acres in specific areas of the DBNF. GEAs and VMUs represent opportunities for grouse habitat improvement.

Strategies:

1. Coordinate with FS biologists and foresters to ensure specific grouse management needs are incorporated into forest management prescriptions.
2. Pursue a joint FS-KDFWR position on each FS Ranger District to implement forest management practices (e.g., operating masticator, plantings, TSI and invasive treatments).
3. Pursue a joint FS-KDFWR biologist/writer position on each FS Ranger District to assist FS staff with NEPA and ESA compliance.
4. Pursue Memoranda-of-Understanding (MOUs) as needed to plan and implement large-scale habitat improvement projects for grouse on GEAs and other DBNF lands not encompassed by a WMA.
5. Pursue Stewardship Contracting where KDFWR and partners propose to implement specific, large-scale forest habitat management work on DBNF and, if approved by the FS, essentially act as contractors that ensure the work happens with intended results.
6. Develop a unified FS-KDFWR public outreach strategy that emphasizes federal and state collaboration on forest wildlife habitat improvement that includes commercial timber harvest and noncommercial treatments.

Assessment:
Implement 3 strategies in 10 years.

Challenge 3: Expand focal areas to focal landscapes.

To ensure viable grouse populations on focus areas, we must promote young forest habitat on private lands surrounding focal WMAs and the DBNF to increase habitat connectivity. This has the added benefit of improving recreational opportunities (hunting, viewing) grouse and other wildlife.

Strategies:

1. Collaborate with private lands and farm bill staff to identify suitable private lands (e.g., >70% forested, connected to focal areas) within at least a 3-mile radius of focal areas (based on average effective dispersal distance of juvenile Appalachian grouse; Smith 2006) to target for technical and financial assistance (e.g., Farm Bill programs).
2. Assess KDFWR databases of previously-assisted private landowners to identify potential revisits where forest management practices, especially timber harvest and timber stand improvement (TSI), could be recommended or enhanced.

3. Collaborate with KDF to identify previously-assisted private landowners for potential revisits where grouse-specific forest management practices could be recommended.
4. Collaborate with NRCS to identify private landowners who previously participated in Farm Bill programs (e.g., EQIP, WHIP, CSP).
5. Promote potential cost-share programs for habitat work available through EQIP contracts (Environmental Quality Incentives Program) with NRCS, in particular the EQIP-Southeast Kentucky Early Successional Habitat Initiative (SEKESH), the portion of EQIP devoted specifically to young forest habitat, currently available in 27 counties. Also promote EQIP Wildlife and Forestland Initiatives. Use phone calls, mailings, website postings, newsletters, flyers, and booths at local festivals, and in the Kentucky Afield TV show and magazine.
6. Work with NRCS and KDFWR Farm Bill Program staff to tweak the SEKESH Initiative by (1) including additional counties where grouse season is currently open, (2) garnering additional ranking points for landowners located within focal landscapes surrounding focus areas, and (3) renaming SEKESH to EKESH (inclusive of all of east KY grouse counties in NRCS Areas 3 and 2) or "Young Forest Initiative" (simpler).
7. Support and utilize the newly created joint FS-NRCS (USDA Natural Resources Conservation Service) forester position on the London Ranger District to (1) write forest management plans for private landowners interested in wildlife and (2) to facilitate FS activities benefitting grouse, other young forest species, and habitat improvements on the DBNF.
8. Work with NRCS and FS to create additional joint forester positions in other DBNF Ranger Districts.
9. Pursue focal area opportunities on large privately-owned properties (e.g., timber company lands) for public hunting, population monitoring, and integration of grouse habitat prescriptions with primary timber objectives.
10. Promote invasive species control/management following forest management to private landowners.

Assessment:
Implement 6 strategies in 10 years.

Challenge 4: Control hunting pressure on focal areas.

Focal area efforts will increase public attention and would likely increase hunting pressure on local grouse populations. Harvest management will focus on providing high quality hunting opportunities (i.e., low hunting pressure, increase flush rates).

Strategies:
1. Limit hunting pressure on focal WMAs or DNBF areas by considering
    - Reduced bag limits.
    - Reduced season length or hunting only on specific days of the week.
    - Close season if warranted based on monitoring surveys or for research needs.

Assessment:

Implement 1 strategies in 2 years.

Challenge 5: Monitor grouse population response to habitat change.

Surveys will be needed to track how grouse respond to forest management efforts. In addition, forest disturbance (i.e., damage) from the 2012 tornado offers a unique opportunity to track how grouse respond to a large natural disturbance.

Strategies:

1. Collaborate with the KDFWR Research Program to design and implement appropriate grouse drumming survey methods to estimate grouse abundance (e.g., density and/or occupancy) on focal areas with intensive surveys, and to monitor long-term trends with indices comparable to surveys done regionally (driving routes).
2. Determine the most feasible means to survey grouse within the tornado paths (Fig.3).
3. Survey deer, turkey, and small game hunters on focal WMAs.
4. Develop a smart-phone app and online web form for hunters and others to enter grouse observations.
5. Publish annual reports documenting focal area habitat work and survey results, with "benchmark reports" published every 5 years to summarizing progress, roadblocks, and emerging opportunities.
6. Publish research findings relating habitat work to grouse population response on focus areas.

Assessment:

Implement 3 strategies in 10 years.

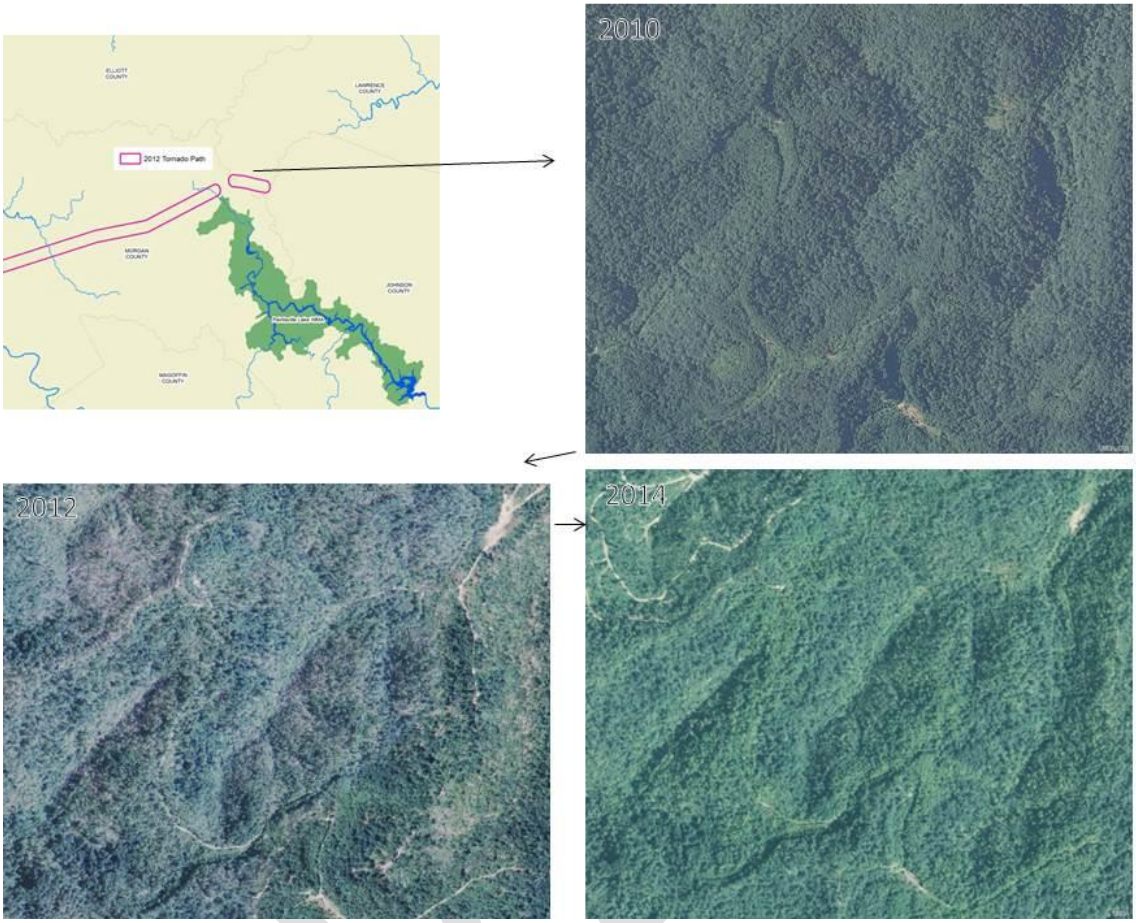

Figure 3. Images of forest change 2 years before (2010; top right), immediately after (2012; bottom left), and 2 years after (2014; bottom right) the 2012 tornado outbreak in Morgan and Lawrence Counties.

Challenge 6: Conduct Kentucky-based grouse research.

Grouse have been studied extensively in their northern range and the Appalachians, but information specific to Kentucky's local and landscape-level habitat conditions is lacking. Collaboration with the Wildlife Research Program and universities can help fill knowledge gaps and improve management of the resource.

Strategies:

1. Evaluate associations between grouse occupancy and land cover, patch size, stand-level habitat variables, connectivity and corridors, and weather and stochastic events.
2. Apply predictive GIS (geographic information systems) models of habitat suitability or availability on focal areas.
3. Evaluate forest management techniques and associated quality and quantity of resulting habitat, with brood habitat of particular interest given its implications on reproduction (Devers et al. 2007).

4. Determine optimal restoration techniques at the stand-level (e.g., forest overstory structure, age classes, stand structure) and landscape-level (e.g., optimal restoration patch size and levels of fragmentation.
5. Identify optimal approaches to mitigate negative attitudes towards grouse restoration (e.g., human dimensions).
6. Determine factors limiting grouse populations in oak-dominated forests.
7. Evaluate key factors influencing colonization, survival, extinction probability, recruitment, fecundity, grouse hunter success, satisfaction/attitudes, and willingness to financially contribute to restoration.

Assessment:
Implement 3 strategies in 10 years.

Challenge 7: Improve public knowledge and perception of grouse restoration efforts in focal areas.

Managing grouse habitat requires cutting trees to create the young forest conditions the species requires. Public perception of logging, prescribed fire, and the use of herbicides to manage stand composition is controversial and all-too-often unfavorable, despite scientific evidence supporting such tools as necessary to reverse the decline of many early-successional wildlife species and of oak in Appalachian forests – two problems the public largely does not understand and is not aware of. Opposition to forest management on focal WMAs is anticipated.

Strategies:
1. Link to a detailed explanation of the plan on the KDFWR homepage.
2. Create a KY Grouse Facebook page.
3. Engage members of the Kentucky Grouse Hunters Association.
4. Engage local Ruffed Grouse Society chapters (KY, OH, WV, VA, TN).
5. Produce grouse and forest management segments on Kentucky Afield television.
6. Write articles for major state newspapers (i.e., Lexington and Louisville markets) and magazines of various types (hunting, forestry, local interest, environmental).
7. Incorporate grouse and young forest messaging in University of Kentucky (UK) Forestry Extension landowner workshops.
8. Commission grouse artwork by Rick Hill.
9. Produce an educational exhibit at Salato Wildlife Education Center.
10. Incorporate grouse educational material in CEPL school curriculum.
11. Collaborate with UK Forestry Extension and KDF to promote forestry with county FFA and 4-H programs.
12. Incorporate grouse habitat management into the annual Kentucky Envirothon competition.
13. Create informational brochure showing grouse habitat management needs.
14. Create displays for use at Earth Day and Arbor Day events.

15. Speak at Fire Learning Network events to engage stakeholders concerned with management of the DBNF.
16. Collaborate with the Kentucky Chapter of The Nature Conservancy (TNC) to promote prescribed fire and ecosystem restoration.
17. Produce a Habitat How-To video segment on the importance of sustainable forest management, timber, and invasive species.
18. Erect signage on focal areas.
19. Foster multi-state momentum for grouse and young forests to turn the tide nationally.

Assessment:
Implement 10 strategies in 10 years.

Goal 1 Overall Target: A two-fold increase in focal area grouse populations in response to habitat improvement (Dimmick et al. 1998) based on at least 5 years of monitoring data.

GOAL 2:

Increase grouse populations across eastern Kentucky.

Challenge 1:
Partner with the forestry community to promote sustainable forest management.

The only feasible way to impact habitat on a regional scale is to pursue common ground and consistent messaging with foresters, forestry industry, and forestry educators. The ultimate goal is forest management that improves the lives of eastern Kentuckians and their economies, while concurrently providing healthy young forest habitat for grouse and other species.

Strategies:
1. Collaborate with the Kentucky Forest Industry Association on a unified strategy to promote mutual interests.
2. Collaborate with the Kentucky Bourbon industry to promote long-term sustainability of white oak stocks in east Kentucky.
3. Engage the Kentucky Woodland Owners Association to convey to private landowners the critical importance of their forest management.
4. Engage students and faculty at the University of Kentucky (UK) and Eastern Kentucky University (EKU) to promote "cross-pollination" of forestry and wildlife education for forestry and natural resource majors (McShea et al. 2007).
5. Collaborate with the Kentucky Division of Forestry (KDF) to take advantage of each agency's respective strengths and mutually beneficial conservation missions.
6. Pursue involvement in the Shaping Our Appalachian Region (SOAR) campaign to seek markets for low-grade timber that could be harvested for profit while providing young forest habitat.
7. Promote the need for private landowners to think about forest health before harvesting timber.

8. Spread the idea of grouse inseparably linked with forestry ("Ruffed grouse – the forester's biggest fan").
9. Evaluate pros and cons of forest certification for WMAs (e.g., American Tree Farm System, Sustainable Forestry Initiative, or Forest Stewardship Council).

Assessment:
Implement all strategies in 10 years.

Challenge 2:
Partner with the nongame wildlife community to promote young forest and oak silviculture for a diversity of species, with emphasis on declining songbird populations (Fig. 2).

More ground will be gained in the fight for more young forest habitat if the needs of nongame species of conservation concern are actively promoted alongside those of grouse and other game species. Key examples include neotropical migratory songbirds (e.g., cerulean and blue-winged warblers, whippoorwill), but also forest bats (Virginia big-eared bat).

Strategies:
1. Promote grouse as an "umbrella" species to conserve associated young forest species.
2. Collaborate with KDFWR Wildlife Diversity Program to ensure mutual benefits for grouse and nongame species that utilize young forest habitats.
3. Collaborate with Wildlife Diversity Program staff and the U.S. Fish and Wildlife Service (FWS) to avoid negative impacts to nongame species during the creation of young forest/early successional habitats, most notably bats in summer maternity habitat.
4. Highlight benefits of unpopular but critical young forest habitat to landowners, loggers, and county ag agents through field days
5. Write articles in popular media for birders.
6. Present grouse management efforts to local bird conservation groups.
7. Encourage nonhunters to purchase a hunting license for habitat improvement.

Assessment: Implement all strategies in 5 years.

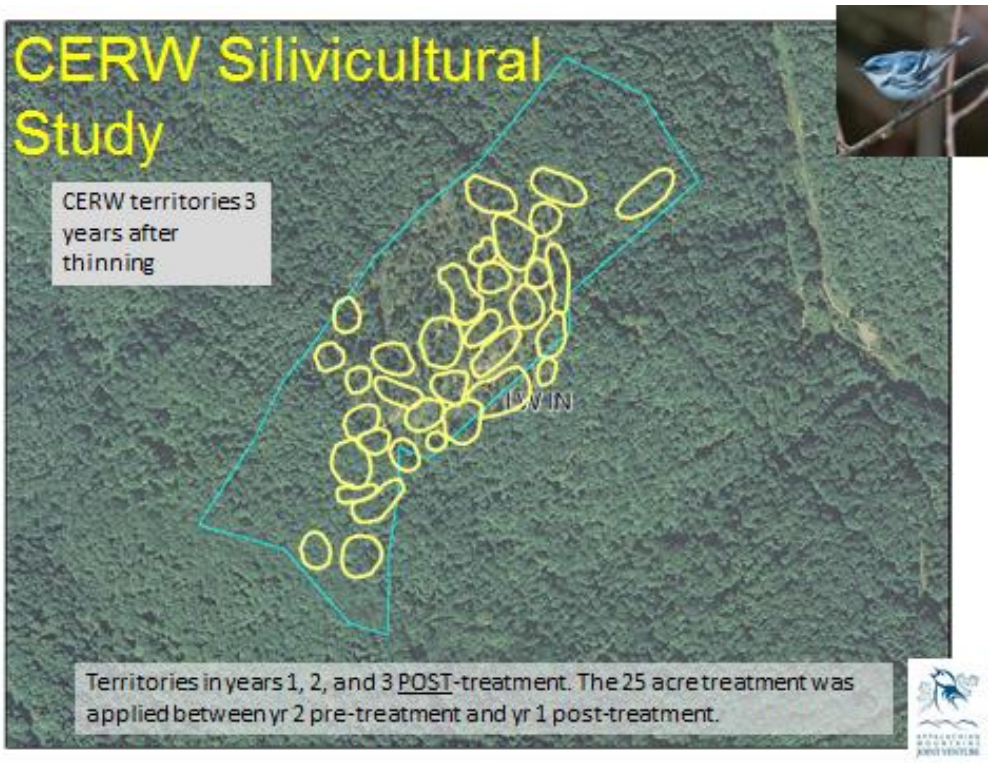

Figure 4. Response of cerulean warblers to a 25-acre commercial shelterwood harvest on a study site near Cave Run Lake, KY, as part of the Cooperative Cerulean Warbler Research Project (Wood et al. 2013). Residual basal area was 50-60 ft^2 per acre, creating semi-open canopy conditions. Cerulean territories increased from 7 pre-treatment to 34 post-treatment. Cerulean territory density Although this residual basal area is higher than ideal for ruffed grouse (~25 ft^2 per acre; Dessacker et al. 2006), habitat suitability for grouse would be improved.

Challenge 3:
Partner with the KDFWR Big Game Program to promote young forest habitat management for grouse, elk, and deer.

Closed canopy forest may offer hard mast to elk and deer, but adjacent younger stands and thinned partial harvests (e.g., shelterwood) provide more woody browse and herbaceous forage potentially.

Strategies:
1. Promote benefits to deer and elk to garner sportsmen's support for forest management (timber harvest, timber stand improvement, prescribed burning, treating invasive species).
2. Seek funding sources that for benefit grouse and big game.
3. Collaborate with Big Game Program to monitor browsing impacts on forest regeneration, soil disturbance, and invasive plant species prevalence following forest management.

Assessment: Implement all strategies in 2 years.

Challenge 4:
Improve survey methods to monitor long-term regional trends in grouse abundance.

Long-term trend data is needed to track population status, but current grouse survey methods (i.e., spring drumming driving routes in WMAs with no active forest management) must be revamped to provide statistically valid estimates of grouse abundance.

Strategies:

1. Collaborate with the KDFWR Wildlife Research Program to revise spring drumming survey driving routes to monitor grouse outside focal areas (i.e., to maintain baseline range-wide trends).
    a. Utilize a probabilistic sampling design to establish new grouse survey routes.
    b. Conduct power analyses to determine adequate statistical power, both for routes established in grouse focus/emphasis areas and in outlying regions.
    c. Evaluate Kentucky-specific probabilities of detection.
2. Collaborate with grouse managers in other states to align Kentucky monitoring with regional monitoring efforts.
3. Recruit more hunters to submit hunter-cooperator logs for flush-rate trend data.
4. Develop smart-phone app to allow citizen science data collection by hunters and outdoor enthusiasts.

Assessment: Implement 3 strategies in 3 years.

Challenge 5:
Monitor health (i.e., disease) of grouse populations.

Disease is commonly cited by hunters as a cause of grouse population declines when habitat conditions appear to be suitable. While habitat is the over-arching driver of grouse populations, the impact of disease on grouse in Kentucky are almost completely unknown.

Strategies:

1. Collaborate with the Wildlife Health Program to conduct active disease surveillance by sampling a subset of grouse via trapping and blood collection.
2. Conduct passive disease surveillance approach to opportunistically sample hunter-harvested grouse.
3. Encourage grouse hunters to submit blood samples.

Assessment: Implement all strategies in 4 years.

Goal 2 Overall Target: Use drumming surveys, hunter-cooperator logs, and citizen science data to assess range-wide stability of grouse populations (i.e., increase or decrease) in 10 years.

GROUSE MANAGEMENT CHALLENGES

The national Ruffed Grouse Conservation Plan (Dessecker et al. 2006) summarized the challenges facing ruffed grouse management range-wide, most of which apply to Kentucky:

Public misunderstanding of the ecological role of forest disturbance

The public is poorly informed about the importance of disturbance in forest ecosystems, including the historic role of fire in shaping present forest conditions and the current need for forest management to maintain oak in eastern hardwood forests. Likewise, early successional and young forest habitats are unpopular and underappreciated (Askins 1997). The resulting public opposition to forest management, particularly commercial timber harvest, often leads to litigation and subsequent policy restrictions that hinder conservation efforts for declining young forest. Educational outreach will be critical to changing public opinion and behavior (Dayer et al. 2014).

For grouse, the habitat issue centers on the loss of young forest habitat. The early successional age-classes of trees that provide ideal early seral condition (i.e., high stem density) are being lost to forest maturation and simply are not being regenerated fast enough across the state and region, evidenced by trends in Forest Inventory and Analysis (FIA) data maintained by the U.S. Forest Service (Dessacker and McAuley 2001, Shifley and Thompson 2011).

This issue is not confined to grouse or other disturbance-dependent game species like the northern bobwhite. Wildlife managers have observed declining trends in many early successional wildlife species for years. Over 100 species of birds depend on early successional habitat, and many states list several early successional species of significant conservation concern in their State Wildlife Action Plans (SWAP)[1], including 13 in KDFWR's (Warburton et al. 2011), plus several others that have been shown to benefit from forest management practices (Rodewald undated) also beneficial to ruffed grouse.

From a grouse-hunting perspective, the problem is noticeable on federal lands like the Daniel Boone National Forest where many grouse hunters hunt. Forest management by the U.S. Forest Service has been limited by litigation over the past 20 years, resulting in protracted planning and public outreach that takes years to implement. Valuable habitat management tools, such as commercial timber harvest, prescribed burning, and herbicide treatment have been limited.

Timber harvesting continues on private lands, but harvest regimes may leave too much residual basal area to allow understory development (Dessacker and McAuley 2001).

Abandoned old fields are important to grouse because of the regrowth of stands of high stem density, early successional forests. The increase of agriculture demand has led to fewer cleared fields being abandoned, and therefore fewer early successional habitats.

Long-altered disturbance regimes, changing economic conditions and human population demographics, the lack of social tolerance for forest management, and lack of market demand for

[1] State Wildlife Action Plans are required of state wildlife agencies to receive congressionally appropriated funds from the State Wildlife Grants program, designed to conserve nongame fish and wildlife.

those willing to manage forests have contributed to a "perfect storm" against ruffed grouse in the Appalachians.

Availability of commercial markets for wood fiber

Markets for poor quality and small-diameter trees are limited in Kentucky, making timber stand improvements (e.g., thinnings, releases) unprofitable and therefore less adopted, which is exactly what is needed in many cases regenerate desirable species like oak in eastern hardwood forests. Conversely, markets for high-grade lumber and veneer logs are more readily available, but reliance on markets for larger trees leads to widespread high-grading (often called "selective cutting") where only the best trees are removed (Stringer 2016). High-grading may be unintentional on the part of the landowner who wishes to maintain the overall look of a mature forest while deriving some income for choice timber trees. Taking only the best growing stock but leaving "cull" and suppressed trees can remove valuable mast producers and prevent understory development for the future stand and for wildlife.

Forest fragmentation

Ruffed grouse require extensive forested landscapes. Historically, grouse occurred throughout Kentucky in the once-favorable forest, woodland, and barrens habitats. Conversion to agriculture during the 19th century fragmented forests into small, isolated blocks insufficient to support grouse populations in the face of unregulated market hunting, which led to the species' extirpation in the western two-thirds of the state (Palmer-Ball 1996).

Forest ownership fragmentation

Fifty-three percent of Kentucky's forests are in large blocks but are divided among many individual ownership parcels. Of all Kentucky forestland owned by private individuals, only 10% is in parcels of at least 500 acres. Over half (55%) of privately owned forest parcels are less than 100 acres. Parcelization is increasing in many areas of the U. S. (Dessecker et al. 2006). Forest management is less feasible on small parcels (i.e., are not profitable to loggers), which limit opportunities for habitat management. Additionally, small parcel owners are less likely to have a forest management plan in place (Kentucky Division of Forestry 2010).

West Nile Virus

The extent to which this disease impacts ruffed grouse in Kentucky is unknown. Wild sage grouse in Wyoming and captive-reared ruffed grouse in Pennsylvania suffered high mortality from West Nile Virus, but samples of hunter-killed grouse from Minnesota showing the presence of antibodies to the virus may suggest ruffed grouse can defend against the disease to some extent (Dessacker et al. 2006). Research is ongoing (L. Williams, Pennsylvania Game Commission, personal communication).

Ungulate browsing

Browsing by white-tailed deer on regenerating deciduous tree and shrub species can affect stem densities, which could reduce habitat quality for grouse (Dessacker et al. 2006). Deer populations

are low in much of eastern Kentucky, but forest management that reduces canopy closure and stimulates understory vegetation development will likely increase deer use of such areas.

Data needs for population management

Kentucky has conducted spring drumming surveys as an index to population change for approximately 3 decades. However, improvements are needed to ensure surveys are located along randomly selected routes, so new techniques will be evaluated.

Lack of land ownership

KDFWR only owns approximately 26,570 acres within its Northeast and Southeast Regions where grouse primarily occur. Therefore, Kentucky grouse restoration will hinge on the support of partner federal and state agencies and private landowners who own grouse habitat.

Invasive plants

Invasive exotic plants are an unfortunate reality for land managers across the U. S. Invasives are particularly troublesome for early successional management due to their tendency to thrive in high-sunlight conditions that result from disturbance. The worst offenders in east Kentucky include tree-of-heaven (*Ailanthus altissima*), stiltgrass (*Microstegium vimineum*), Japanese knotweed (*Fallopia japonica*), autumn olive (*Elaeagnus umbellata*), among other. Managers must be treated known invasive infestations prior to forest harvest, and be vigilant and aggressive at retreatment in subsequent years. Invasive insects such as the hemlock wooly adelgid (*Adelges tsugae*) and emerald ash borer (*Agrilus planipennis*) are decimating populations of hemlock (*Tsuga canadensis*) and ash (*Fraxinus sp.*) trees. There is no practical preventative treatment feasible over large areas. These species are expected to seriously impact forest health, composition, and structure.

GROUSE ECOLOGY AND MANAGEMENT

Distribution

The ruffed grouse is the most widespread grouse species and gallinaceous gamebird in North America, occurring across Canada and the northern U.S., ranging south in the Rocky Mountains to Utah, and south in the Appalachian Mountains to north Georgia. Of twelve subspecies in North America, only the Appalachian ruffed grouse (*B. u. monticola*) inhabits Kentucky (Dessecker et al. 2006).

Historically, ruffed grouse were found throughout the Central Hardwood region of the eastern to Midwestern U.S., including all of Kentucky. Land use change (e.g., clearing and fragmentation of forests for agriculture and development) and resulting mortality factors (e.g., over-hunting and depredation) led to the extirpation of grouse in the western two-thirds of Kentucky and surrounding states. Disjunct populations were and may still be present in parts of some Midwestern states, such as the Missouri Ozarks, as a result of restocking efforts from the 1950s to 1990s (Robinson 1984; J. Sole, personal communication).

Restocking in Kentucky occurred from the 1980s through the 1990s with the trap-and-transfer of grouse from several eastern counties to large blocks of forested habitat in western Kentucky, such as The Land Between the Lakes National Recreation Area, Pennyrile State Forest, Tradewater WMA, and Fort Knox Military Reservation (J. Sole, personal communication). Habitat quality (i.e., young, early-successional forest) was available to grouse at release sites during the restocking years, but such habitat was not maintained through subsequent forest management to regenerate hardwood stands, equating to habitat loss. Coupled with the deleterious effects of landscape-level habitat fragmentation on grouse population viability, this led to population declines, probable local extinctions, and the lack of extant populations in those restocked areas at present.

Today grouse are present in all counties within the Cumberland Plateau and Mountains of eastern Kentucky and persist in very low densities in the Outer Bluegrass Region along forested river corridors like the Kentucky and Licking Rivers. Grouse hunting is currently open in 53 Kentucky counties, from the eastern border with Virginia and West Virginia, to as far west as Cumberland and Adair Counties in the south and Pendleton and Campbell Counties in the north. A limited December-only season has remained open for many years farther west at Pennyrile State Forest, Tradewater WMA, and Fort Knox, although population persistence at these locations is unlikely.

Management by KDFWR

Grouse habitat has changed over time on KDFWR Wildlife Management Areas in northeast and southeast Kentucky. When the U. S. Army Corps of Engineers purchased the properties in the 1960s, former farm fields reverted to young forest, providing a couple decades of high quality grouse cover. WMAs within the DBNF, and the DBNF itself, were suitable for grouse in past decades due to the extent of timber management. Over the past four decades, forest management on public areas in eastern Kentucky has generally declined. KDFWR regional staff currently manage habitat on Wildlife Management Areas that benefits grouse, but such management has until recent years primarily focused on maintaining open areas for wildlife. Active forest management has increased on KDFWR owned

KDFWR produces an annual Ruffed Grouse Population Status Report, which is a compilation of 2 surveys conducting annually to track the status of Kentucky's grouse population. First, a drumming survey utilizes KDFWR biologists to conduct 15-stop driving routes during the month of April to listen for and record the number of grouse drumming at each stop. Second, a grouse hunter log survey summarizes hunting activity and success of hunters across the state. We combine the information from both surveys to monitor trends in grouse abundance and hunter effort and success.

KDFWR needs additional data to strengthen the utility of drumming and hunter log surveys. Most drumming survey routes were designed to sample grouse on public Wildlife Management Areas and on the Daniel Boone National Forest. However, relatively little forest management has occurred on these areas, leading to predictable declines in habitat quality for grouse and corresponding declines in detections of drumming male grouse. Few driving routes sample private lands where grouse habitat may have been improved from active timber operations or

damage from ice storms or the 2012 tornado. Redesigning survey routes to cover a more representative portion of eastern Kentucky could improve our data quality and inferences about grouse population status. Other, more intensive drumming surveys (Guillion 1966, Dimmick et al. 1998) could be adopted to monitor grouse and obtain density estimates in response to habitat improvement through management and storm damage. Grouse hunter logs provide valuable information on hunter effort and success. Unfortunately, the number of hunters completing logs has declined over the years. KDFWR must work to recruit more hunter-cooperators for the hunting log surveys.

Habitat requirements

Ruffed grouse are encountered in fall and winter by hunters, heard in spring when drumming males advertise to attract mates, and seen along forest trails in summer when female grouse are raising broods of chicks. Their presence in different habitats throughout the year reflects how habitat use differs among seasons, between males and females, and between adults and young. While weather, predators, and hunting contribute to grouse mortality, habitat is of over-arching importance because it buffers grouse populations from those other factors and is the factor managers can most easily control.

The following is brief summary of the basic biology and habitat needs of Appalachian ruffed grouse. For a more thorough explanation, consult Stauffer et al. (2011), Atwater and Schnell (1989), and the many excellent research papers referenced therein.

Young forest

The ruffed grouse can survive at low densities in many types of forested landscapes, but they are abundant only where young forest approximately 5 to 20 years old is available (Dessecker et al. 2006, Harper et al. 2011). Young forests offer high stem densities (e.g., 5,000 to 8,000 stems/ac) that provide both food and cover (Thompson and Dessacker 1997). Such areas result from heavy disturbances that remove a forest overstory (canopy). Increased sunlight reaching the forest floor stimulates dense growth of herbaceous forbs, shrubs, and tree seedlings and saplings. Forest disturbance results from severe wind and ice storms, fire, drought, insect or disease outbreaks, and from human land uses like logging, firewood cutting, or agriculture, all of which remove the existing forest canopy by damaging, killing, or removing trees. Grouse will not venture far into open habitats resulting from forest clearing and conversion to other land uses, such as farm fields or developments, unless or until such areas are allowed to revert to young forest, which can constitute excellent habitat.

Most suitable grouse habitat is created through forest management that removes enough trees from a forest stand to regenerate a new young forest stand or to create small pockets of regeneration within the existing stand. In other words, grouse habitat is created by using silvicultural methods that remove sufficient basal area from a forest stand using either even-age or uneven-age (Dessacker and McAuley 2001, Harper et al. 2011). Even-age methods result in a stand of 1 or 2 age-classes of trees; examples are clearcuts, shelterwood cuts, or irregular shelterwood cuts (aka shelterwood-with-reserves). Uneven-aged methods include single-tree

selection cuts, which do not produce grouse habitat, and group-selection cuts, which can create patches of regeneration a few acres (i.e., <10 ac) (SAF 1998, Smith 1986.

Grouse often use stands within the first 5 years following a heavy cut or other major disturbance, primarily along the periphery for brood-rearing or nesting. This period is called the stand initiation phase when trees and shrubs present in the understory prior to the disturbance (regeneration), stump sprouts from harvested trees, and newly established seedlings take advantage of available sunlight and grow vigorously (Loftis et al. 2011). Soft mast is often abundant at this stage; some important examples include blackberry (*Rubus* spp.), greenbrier (*Smilax* spp.), serviceberry (*Amelachier* spp.), blueberry (*Vaccinium* spp.), dogwood (*Cornus* spp.), viburnum (*Viburnum* spp.), and holly (*Ilex* spp.) (Long et al. 2011).

Grouse use of the stand picks up around 5 to 6 years post-disturbance as regenerating trees continue to grow and expand their crowns. Canopy closure is reached around year 10, which begins the stem exclusion stage when further seedling establishment stops and over-topped trees die. This stage lasts for many years, although grouse only use stands heavily for the next 5 to 10 years (i.e., years 15 to 20 post-disturbance). As trees develop into pole-timber size classes, grouse use declines (except see *nesting* below). Many years later, trees mature and eventually herbs, shrubs, and saplings again grow in the understory, a period called the understory reinitiation phase, which can occur when the stand is nearly rotation age (e.g., 80 to 120 years); grouse broods make use of this stage, as do all grouse feeding on hard mast.

Hard mast

In addition to young forests, hard mast is very important for Appalachian grouse as a high-energy food source for survival and reproduction. Historically, the predictable annual crop of American chestnuts (*Castanea dentata*) would have been a major dietary component for grouse and many other species. Since the loss of chestnut to disease (*Cryphonectria parasitica*), grouse rely on two other high quality foods: acorns and beechnuts. Compared to American chestnut which flowered later in summer, fruit production from oak (*Quercus spp.*) and American beech (*Fagus grandifolia*) is less reliable year to year, due in part to these two species' earlier flowering and greater susceptibility to loss from freezing temperatures.

In contrast, aspen (*Populus spp*.) is the driver for grouse populations in the northern Great Lake States; young aspen stands provide cover while older stands provide reliable, nutritious buds and twigs during the critical winter months when few other foods are available above the snow. In Kentucky and most of the central and southern Appalachians, aspen is rare and not available to grouse in the state's two main forest types, oak-hickory and mixed-mesophytic hardwoods. Research supports the hypothesis that Appalachian grouse are limited by foods (i.e., hard mast [acorns and beechnuts]) available to female grouse in late winter (Norman and Kirkpatrick 1984, Servello and Kirkpatrick 1987, Stauffer et al. 2011). Chick survival is related to body fat of female grouse, which depends on the consumption of high-energy food during winter (Devers 2007).

Oak-hickory forests are prevalent on ridges and upper and mid-slope positions on south- and west-facing aspects. Mixed-mesophytic forests occur naturally in deep coves, bottomlands, and

lower slope positions on north- and east-facing slopes. These are generalizations, as both forest types occur throughout eastern Kentucky and in close proximity on a given site based on topography and related site conditions (e.g., aspect, slope position, moisture, soil type), as well as disturbance (e.g., fire, forest management). Both oak-hickory and mixed-mesophytic forest types have value to grouse in terms of hard mast from mature stands (i.e., acorns and beechnuts, respectively), but grouse populations are supported only when sufficient young forest is abundant and available nearby or within the same stand (e.g., after oak shelterwood harvest).

Prior to European settlement, fire maintained early successional habitats (e.g., young forest, savanna, open woodland) and played a major role in shaping the distribution of forest types in eastern North America, including the Appalachains (Spetich et al. 2011) and, along with site factors such as aspect and soil moisture, was responsible for the distribution of oak-hickory forests of today. Fire suppression coupled with unsound forest management for a century has led to a major decline of the oak component of eastern forest. This has implications for all forest wildlife, including ruffed grouse.

Other foods

Ruffed grouse feed on a diversity of foods throughout the year. Herbaceous vegetation, soft mast (fruits), flowers and vegetative buds and catkins from shrubs and trees are consumed when available. Reliance on evergreen leaves, such as greenbrier, mountain laurel, and wintergreen are poor quality foods but are regularly consumed, indicative of the nutritional stress of Appalachian grouse (Long et al. 2011).

Drumming

Male grouse begin drumming in late February and March, with a peak in drumming and mating during April (Buehler et al. 2011). During this period, KDFWR and other state wildlife agencies conduct annual drumming surveys along specific driving routes. The resulting data are used as a long-term index of grouse population levels in an area. Display sites where drumming occurs are often located along ridges and usually contain high stem densities to provide optimal cover (Whitaker 2006).

Nesting

In the Appalachians, female grouse (hens) start nesting in mid-April to early May, with incubation lasting approximately 24 days, and hatching in May and June. Clutch sizes are 9 to 11 eggs, which is slightly lower than northern populations. Nearly all hens attempt a nest, most nests (66%) are successful (i.e., at least one egg hatched), and of those most eggs hatch (87%) (Tirpak et al. 2011). However, few hens attempt to renest when first nests are lost, which is likely related to the poor physical condition of many hens entering the spring reproductive period, due to poor nutrition. Unlike hen grouse in northern states that forage on aspen through the winter, Appalachian hens largely rely on high-energy foods like acorns and beechnuts to build adequate fat reserves in late winter, preparing them to produce and lay viable eggs in spring. But hard mast production is highly variable year to year.

Grouse typically place nests against the base of a tree, log, stump, boulder, or in a brush pile, likely to provide concealment from behind and visibility in front of the hen. Compared to random locations, nest site locations have higher basal area (i.e., number or density of trees) such as in poletimber- and sawtimber-sized forest stands. Other characteristics (e.g., more stumps and logs, greater deciduous cover, less ground cover, closer to openings, percent young or old forest in the surrounding area) were important but to a lesser degree.

For nesting cover, managers should retain poletimber and sawtimber stands close to prime young forests. Logging slash, felled unmerchantible trees, and stumps should be left covering at least 20% of a harvested area when residual basal area after harvest is low (<25 ft^2/ac) (Tirpak et al. 2011).

Brood-rearing and chick survival

Grouse chicks are precocial and leave the nest soon after hatching. Within the first 3 to 4 days, hens move broods to areas where chicks can forage for high-protein insects under the concealment of overhead vegetation not too dense at ground-level to impede movement. But brood movements make chicks vulnerable to predators and exposure to weather.

A clear implication of Appalachian Cooperative Grouse Research Project (ACGRP) research is that poor chick survival limits Appalachian grouse populations compared to populations in northern states. Overall chick survival to 35 days old was only 22% (Smith et al. 2011), compared to >50% chick survival to 84 days in Alberta (Rusch eat al. 1971). Chick survival probability decreases sharply a few weeks after hatching, with estimates ranging from 6-19% at 5 weeks and 7% at 10 weeks (Smith et al. 2011), compared to the 32% survival at 11 weeks in Michigan (Larson et al. 2001). Whole-brood loss (29%) is prevalent in Appalachian grouse. Of 118 chicks where researchers could determine fate of the brood, 110 (93%) died before 35 days old, mostly due to exposure (49%) or predation (48%). The distances hens travelled with broods is highly variable, ranging from 41 to 689 meters during the first week, with increasing distance as the chicks aged (Smith et al. 2011). Chick survival decreased as broods moved farther from the nest site. Home range sizes of hens with broods was larger (96 ac) than hens without broods (37 ac). In oak-hickory forests, hens used hollows and bottomlands more than dry uplands.

Supplying quality brood-rearing cover for grouse broods in close proximity to early successional areas should be of paramount importance. Managers should create areas with a well-developed, diverse ground cover that allows movement underneath. In oak-hickory stands, patch cuts and thinnings that promote lush ground cover and soft mast (e.g., blackberries) should be located in moist bottomlands and riparian areas where erosion potential is low, and along forest roads and trails. Thick perennial grasses that restrict chick movement should be avoided. Broods also use mature forest with lush understories, so thinning or burning in mature stands should be considered.

Roosting

In northern regions, grouse roost in snow to conserve energy and escape predators. In the Appalachians where snowfall is limited in amount and duration, grouse must make use of

available vegetation, and may select evergreen shrubs (e.g., rhododendron, mountain laurel) or coniferous trees (e.g., pine, hemlock, red cedar) with surrounding high stem densities. Winter roosts occur equally on the ground and above ground. Most summer brood roosts are located on the ground until the fifth week when chicks are able to roost independent of the hen. Considerations for winter roosting habitat in winter should include maintaining areas of conifers with dense foliage, like red-cedar or rhododendron, or by implementing clearcuts or heavy selective cuts. Summer brood roosting can be improved with thinning or prescribed burning forest stands, and by seeding logging roads with legumes (Tirpak et al. 2011).

CONCLUSION: BEYOND 2026

This plan covers a 10-year time frame. Managing forests for ruffed grouse must necessarily take a much longer view, consistent with typical rotation lengths for even-aged timber management (e.g., approximately 80-120 years in the Appalachians) (Harper et al. 2011). In 10 years we can get the ball rolling, but we must be thoughtful in the course we take. Science backs the strategies outlined in this plan, but the human dimensions will play a big part in its success. Public scrutiny will be high for a plan based on cutting trees, and public acceptance will only come through a long, committed educational campaign for young forest habitat. In the grouse woods, a hunter often gets only a fleeting glimpse of his flushing quarry, and shots are often taken on faith. We must embrace the challenge of grouse restoration now, on behalf of grouse, blue-winged warblers, oaks, and the suite of other species that cannot lobby for their own existence.

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APPENDIX A.

Grouse Restoration in Kentucky: Report on Stakeholder Input from Public Meetings

Photo Credit: Joe Lacefield

Kentucky Department of Fish & Wildlife Resources

10 June 2016

INTRODUCTION AND METHODS

The Kentucky Department of Fish & Wildlife Resources (KDFWR) hosted a series of 3 public meetings (in Paintsville, Morehead and Corbin) in spring 2015 within the grouse range in eastern Kentucky to facilitate a dialogue with grouse hunters and other interested stakeholders regarding the topic of ruffed grouse restoration. At each public meeting, KDFWR staff members made a presentation on the history and current status of and management for grouse in Kentucky, and solicited public input about future restoration efforts through administration of a brief printed questionnaire to all attendees who were willing to complete the instrument.

RESULTS

We received a total of 115 responses from attendees of the 3 meetings. Under general topic headings below, the questions used in the questionnaire are provided, followed by applicable descriptive statistics or a listing of participant responses, as applicable.

Meeting Locations:

Location	Frequency	Percent[1]
Paintsville	50	43.4
Morehead	20	17.4
Corbin	45	39.1

Grouse Hunting Experiences and Preferences

How many grouse flushed per hour makes a successful hunt in KY?

Flushes per hour:

Average (mean)	Min	Max	Number of Responses
2.4	0	15	111

How many grouse harvested per hunter makes a successful 3-hour hunt in KY?

Grouse harvested per 3 hours:

Average (mean)	Min	Max	Number of Responses
1.5	0	12	108

[1] Percentages in tables may not total 100% in some instances because of rounding or nonresponses.

Grouse Focus Areas

What public lands areas would serve as good grouse focus areas?

Top 5 public lands* most frequently identified by respondents as suitable for grouse focus areas:

Public Lands Area	Frequency
Daniel Boone National Forest	32
Paintsville Lake WMA	14
Dewey Lake WMA	11
Carr Creek Lake WMA	9
Bell	4

*All areas identified in response to this question appear in Appendix 2.

What counties should be targeted for grouse restoration initiatives on private lands?

Counties* identified by respondents as suitable for grouse focus areas on private lands:

County	Frequency
Bell	1
Knott	1
Knox	1
Lewis	1
Martin	1
Morgan	2
Pike	1
“Eastern KY”	1
“Mountain Top Reclaims”	1

*A state map showing Kentucky counties was provided to respondents.

Producing More Grouse in KY

What are the top 5 practices for producing more grouse in KY? Select up to 5 answers:

Top practices identified for producing more grouse in Kentucky:

Practice	Frequency	Percent of Respondents
A. Commercial Timber Harvest	80	69.5
B. Timber Stand Improvement (thinning/culling to benefit preferred trees)	56	48.7
C. Controlled Burning (Prescribed Fire)	38	33.0
D. Permanent, high stem density habitat plots (maintained like patch clear-cuts)	42	36.5
E. Controlling hunting pressure (regulating access, hunting seasons, bag limit, etc.)	30	26.0
F. Invasive Plant control (removing/killing plants like kudzu, bush honeysuckle, etc.)	16	13.9
G. Predator control (removing coyotes, raccoons, etc.)	63	54.7
H. Day-lighting roads and trails (removing trees to get more light in to ground-level plants)	13	11.3
I. Perennial food plots (clover, etc.)	33	28.7
J. Disease monitoring	44	38.2
K. Wild relocation (stocking wild grouse)	41	35.6
L. Planting fruit/food-bearing shrubs	46	40.0
M. Controlling deer density (reducing impacts on understory growth)	5	4.3
N. Other	8	6.9

Size and Management of Focus Areas

How big should a grouse focus area be? (Acres)

Average (mean)	Min	Max	Number of Responses
200,998	12.5	8,000,000*	80

*8 Million was used as an estimate of grouse range in Kentucky for responses such as “Eastern Kentucky” or “Entire Grouse Range.”

Within a focus area, how many acres of quality habitat would be needed to get more grouse?

Acres of quality habitat:

Average (mean)*	Min	Max	Number of Responses
312,458	10	8,000,000	85

*The average acre figure for this question is higher than the previous one because several respondents did not respond to the previous question but did for this one.

If enough habitat management was done in a KY grouse focus area, how many years would it take to produce enough grouse to allow successful hunts (as you define them above)?

Years:

Average (mean)	Min	Max	Number of Responses
8.0	0	20	105

Recent Grouse Hunting Experiences

In the most recent season you grouse hunted in KY, where did you go grouse hunting?

Types of Land Hunted (Percent):

	Average (mean)	Min	Max	Number of Responses
Percent Private Land	60	0	100	102
Percent Public Land	40	0	100	102

How many grouse did you harvest in KY this last season (2014-15)?

Grouse killed:

Average (mean)	Min	Max	Number of Responses
1.6	0	40	104

How many times did you grouse hunt in KY this last season (2014-15)?

Number of different days:

Average (mean)	Min	Max	Number of Responses
4.8	0	45	104

How many of the past 5 grouse seasons did you hunt in KY?

Number of seasons hunted:

Average (mean)	Min	Max	Number of Responses
3.6	0	5	101

Do you usually complete a "Grouse "Hunter Cooperator Survey" for the Department each year?

Response	Frequency	Percent
Yes	17	16
No	89	84

*Respondents who responded "No" were asked to obtain a copy of the Grouse Hunter Cooperator Survey after completing their questionnaire.

Did you grouse hunt in another state during any of the past 5 seasons?

Response	Frequency	Percent
Yes	72	66.6
No	35	32.4

Results from this online public input process were not intended to be statistically representative of any particular population. This is because participation was voluntary (respondents were self-selected), thus members of the entire Kentucky grouse hunting population or other stakeholder groups did not have an equal likelihood of participation (which is approximated through random-sample surveying).

Appendix 1. Areas identified as public lands suitable for grouse focus areas.

	Frequency	Percent
Greenbo	1	.5
KY River	1	.5
Perry	1	.5
Wolf	1	.5
All	3	1.5
Ashland Oil	1	.5
Beaver Creek	2	1.0
Begley WMA	1	.5
Bell	4	2.0
Cane Creek	1	.5
Carr Creek	9	4.5
Carter Caves	1	.5
Cave Run	2	1.0
Caverna SP	1	.5
Clay	2	1.0
Counsol of KY WMA	1	.5
Cranks Crk.	3	1.5
DBNF	32	16.1
Dewey	11	5.5
Ed Mabry	1	.5
Elk Areas	2	1.0
Elk Forest	1	.5
Fishtrap	9	4.5
Grayson	4	2.0
Grayson Lake	2	1.0
Hensley Pine	3	1.5
Howard WMA	1	.5
Knott	1	.5
Knott Co- Quicksand Triangle	2	1.0
Large WMAs	1	.5
Leslie	3	1.5
Martin	1	.5
Mtns. Of SE KY	1	.5

	Murder Branch	1	.5
	Paintsville	14	7.0
	Paul Van Booven	1	.5
	Pine Mtn.	1	.5
	Pioneer Weapons	2	1.0
	Private Lands	1	.5
	Redbird	2	1.0
	Rockcastle	1	.5
	Sinking Crk.	1	.5
	Straight Crk.	1	.5
	Tri-County Quail Club	1	.5
	Whitley	1	.5
	Wood	1	.5
	Yatesville	7	3.5
	missing	54	27.1
	Total	199	100.0

APPENDIX B.

Grouse Restoration in Kentucky: Report on Online Public Input from Stakeholders

Photo Credit: Joe Lacefield

Kentucky Department of Fish & Wildlife Resources

10 June 2016

INTRODUCTION

The Kentucky Department of Fish & Wildlife Resources (KDFWR) hosted a series of 3 public meetings in spring 2015 within the grouse range in eastern Kentucky to facilitate a dialogue with grouse hunters and other interested stakeholders regarding the topic of ruffed grouse restoration. Specifically, staff made presentations on the history and current status of and management for grouse in Kentucky, and solicited public input about future restoration efforts. To help inform the planning and decision-making process for future grouse restoration, KDFWR developed an online public input questionnaire to electronically obtain feedback from grouse hunters and other interested parties statewide. By using electronic means, thousands of Kentucky hunters and others have opportunity to conveniently share their opinions—many more than would be possible via conventional public meetings.

METHODS

The online public input questionnaire[1] was developed using SurveyMonkey™ online software (www.SurveyMonkey.com). The questionnaire was launched online at noon on 23 March 2015 and allowed responses until its closure at noon on 4 May 2015. The link to the electronic questionnaire was posted on the KDFWR Web site, Facebook, and Twitter, and was publicized via a statewide news release to the KDFWR media email distribution list.

Collection of Internet service provider (ISP) addresses provided a means of gauging the extent of repeat entries by the same individuals (which could lead to "swamping" of data by certain individuals or interest groups). A secure server link was also used in the software settings to reduce the risk of respondents' information being compromised while they were completing the online questionnaire.

RESULTS

We received a total of 246 responses. A total of 206 completed, unique online questionnaires were used. We eliminated from reporting records in which only preliminary background data (e.g., state residence) but no opinion or hunting experience data were provided. We removed a few obviously (6) duplicate records; these duplicates appeared to have been submitted by respondents who had begun entering data on a previous date but had not fully completed their questionnaire, so only the most complete (most recent) questionnaire was used in the data summary. Under general topic headings that follow, the questions used in the survey are provided with applicable descriptive statistics or a listing of responses, as applicable.

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[1] This online public input process was not statistically representative of any particular population. This is because participation was voluntary (respondents were self-selected), thus members of the entire Kentucky grouse hunting population or other stakeholder groups did not have an equal likelihood of participation (which can be approximated through random-sample surveying).

Producing More Grouse in KY

What are the top 5 practices for producing more grouse in KY? Select up to 5 answers:

Top practices listed* for producing more grouse in Kentucky:

Practice	Percent of Respondents[1]
Timber Stand Improvement (thinning/culling to benefit preferred trees)	65%
Commercial Timber Harvest	53%
Predator control (removing coyotes, raccoons, etc.)	52%
Permanent, high stem density habitat plots (maintained like patch clear-cuts)	50%
Wild relocation (stocking wild grouse)	46%
Planting fruit/food-bearing shrubs	42%
Controlled Burning (Prescribed Fire)	38%
Controlling hunting pressure (regulating access, hunting seasons, bag limit, etc.)	25%
Perennial food plots (clover, etc.)	23%
Disease monitoring	21%
Day-lighting roads and trails (removing trees to get more light in to ground-level plants)	20%
Invasive Plant control (removing/killing plants like kudzu, bush honeysuckle, etc.)	18%
Controlling deer density (reducing impacts on understory growth)	7%
Other*	12%

*A listing of all "other" responses is provided in Appendix 1.

Grouse Focus Areas

Which of the following Kentucky counties in the grouse zone would serve as good grouse "focus areas" on private lands? Please select up to 5 counties, or leave blank if you don't know:

Top ten preferred counties for grouse focus areas on private lands:

County	Frequency	Percent[1]
Harlan	36	4.5
Lewis	35	4.4
Rowan	34	4.3
Bell	33	4.1
Clay	30	3.8
Leslie	30	3.8
Breathitt	29	3.6
Jackson	25	3.1
Knott	25	3.1
Pulaski	20	2.5

*A listing of all preferred counties is provided in Appendix 2.

[1] Percentages in tables may not total 100% in some instances because of rounding or nonresponses.

Which Kentucky public lands (Wildlife Management Areas or "WMAs") would serve as good grouse focus areas? Please select up to 5 WMAs, or leave blank if you don't know:

Top ten most preferred WMAs* for grouse focus areas:

WMA	Frequency	Percent
Clay WMA	45	5.6
Redbird WMA	37	4.6
Paintsville Lake WMA	35	4.4
Pioneer Weapons WMA	33	4.1
Yatesville Lake WMA	28	3.5
Fleming WMA	27	3.4
Grayson Lake WMA	27	3.4
Beaver Creek WMA	25	3.1
Boone Forestlands WMA	23	2.9
Mill Creek WMA	21	2.6

*Complete list of WMAs preferred for focus areas is listed in Appendix 3.

Size and Management of Focus Areas

How big should a grouse focus area be?

Size	Frequency	Percent
10,000 acres	50	24.3
1,000 acres	43	20.9
500 acres	43	20.9
I don't know	26	12.6
5,000 acres	25	12.1
100 acres	12	5.8
Total	206	100

Based on the acreage you selected in the previous question, what percent of a focus area needs to be managed in order to improve grouse numbers?

Percent Managed	Frequency	Percent
50%	53	25.7
75% or more	48	23.3
25 %	47	22.8
I don't know	34	16.5
10%	15	7.3
Total	197	100

Which of the following are important to you? (These are other benefits of improving grouse habitat.)

Response	Frequency	Percent
Promoting oak and hickory regeneration (reproduction/growth of these important tree species	127	61.7
Favoring native trees and plants by reducing invasive, exotic species (non-native pest plants)	123	59.7
Producing more plant diversity in forested areas	109	52.9
Creating more food and cover for deer, elk and bears	86	41.7
Helping declining songbirds such as the Golden-Winged Warbler	71	34.5
Other (please specify)*	16	7.7
Total	616	100.0

*Other important benefits are listed in Appendix 1.

Grouse Hunting Experiences and Preferences

Have you ever hunted for ruffed grouse?

Response	Frequency	Percent
Yes	160	77.7
No – but I would like to grouse hunt.	39	18.9
No – and I am not interested in grouse hunting.	7	3.4
Total	206	100

How many grouse flushed per hour makes a successful hunt in KY?

Flushes per hour:

Average (mean)	Min	Max	Number of Responses
1.9	0	6	141

How many grouse harvested per hunter makes a successful 3-hour hunt in KY?

Grouse harvested per 3 hours:

Average (mean)	Min	Max	Number of Responses
1.5	0	6	141

If enough habitat management was done in a KY grouse focus area, how many years would it take to produce enough grouse to allow successful hunts (as you define them above)?

Years:

Average (mean)	Min	Max	Number of Responses
7.3	0	30	140

In the most recent season you grouse hunted in KY, where did you go grouse hunting?

Types of Land Hunted:

	Average (mean)	Min	Max	Number of Responses
Percent Private Land	62.3	0	100	116
Percent Public Land	61.7	0	100	100

How many times did you grouse hunt in KY this last season (2014-15)?

Number of different days:

Average (mean)	Min	Max	Number of Responses
4.5	0	30	140

How many grouse did you harvest in KY this last season (2014-15)?

Grouse killed:

Average (mean)	Min	Max	Number of Responses
0.7	0	20	140

How many of the past 5 grouse seasons did you hunt in KY?

Number of seasons hunted:

Average (mean)	Min	Max	Number of Responses
3.0	0	5	138

If you grouse hunted in any other U.S. States or Canada since 2010, please select the 5 you spent the most time grouse hunting in:

Top Other States* Hunted for Grouse:

State (or Canada)	Frequency	Percent
Wisconsin	50	31
Michigan	34	21
Minnesota	18	11
Canada	9	6
Ohio	8	5
West Virginia	7	4
Total	126	78

*Complete results are listed in Appendix 2.

Among the 76 respondents who indicated that they hunted another state (or Canada), 50 (66%) hunted two or more, 22 (29%) three or more, 6 (7.9%) hunted 4 or more, and 5 (6.5%) hunted 5 or more.

Do you usually complete a "Kentucky Grouse Hunter Cooperator Survey" for the Department each year? (The data helps us monitor grouse hunting activity and grouse population trends, and participants receive a hunting cap or other gift for taking the survey.)

Response	Frequency	Percent
No – but I will complete a survey if I'm sent one*	93	66.9
No – I am not interested in completing the survey	23	16.5
Yes	23	16.5
Total	139	100

*Respondents who provided contact information were added to the Grouse Hunter Cooperator Survey mailing list.

Demographics

Which of the following best describes your place of residence? Choose one:

Type of Residence	Frequency	Percent
Large city/urban area	16	7.8
Suburban area	14	6.8
Small city/town	33	16.0
Rural area not on a farm or ranch	64	31.1
Rural area on a farm or ranch	58	28.2
Total	206	100

What is your gender?

Gender	Frequency	Percent
Male	178	96.2
Female	7	3.8
Total	185	100

What is your age today?

Average (mean)	Min	Max	Number of Responses
45.4	17	71	185

What was your total household income before taxes in 2014? Choose one:

Income Category	Frequency	Percent
Less than $25,000	10	4.9
$25,000 to $49,999	33	16.0
$50,000 to $99,999	73	35.4
$100,000 to $249,999	41	19.9
$250,000 or more	12	5.8
Don't know	11	5.3
Total	206	100

Other Comments

At the end of the online questionnaire, respondents were provided with opportunity to provide open-ended comments. Eighty-nine (89) respondents provided feedback through this question. Topics addressed by responses ranged from personal observations ("We have been seeing a steady decline of grouse on our farm for the past 15 years" or "I have grouse hunted since I was 10 years old in Kentucky and the numbers have gone way down here"), to suggestions for improving conditions for grouse (for example, "cut more trees!!!" or "The grouse season is too long; it should be ended on January 31."). All open-ended comments are listed in Appendix 6.

Results from this online public input process were not intended to be statistically representative of any particular population. This is because participation was voluntary (respondents were self-selected), thus members of the entire Kentucky grouse hunting population or other stakeholder groups did not have an equal likelihood of participation (which is approximated through random-sample surveying).

Appendix 1. Other practices listed by respondents for producing more grouse.

Agriculture removing timber from mountains, with invasives--need to include Japanese knotweed
Anything that will discourage those who shoot grouse from a vehicle.
Appears like the focus is cutting some mature timber to me.
Clear cut type of timber harvest
Close season so they can repopulate and shorten season when it is reopened.
Close season until numbers are up
Competition from turkeys, relax turkey harvest restrictions
Controlling turkey density (reducing impacts on understory growth)
Controlling turkey population
get rid of most of the turkeys
Grouse Habitat, need diversity in forest patches. Grouse use different age forest at different times of the year
having enough food for grouse & turkey
hawks, owls.
In Minnesota trails are covered in clover, the grouse are filled with clover leaves, they also daylight around roads and trails.
Massive scale timber harvest is needed. That cannot happen without timber markets.
Monitor out of season poaching. Four wheeler drive-by shootings of grouse.
Other (please list):
plant grouse friendly plants (like clover etc.) on logging decks and logging roads after the logging project has been completed
Reduce turkey density. Turkeys destroy nest sites. When food gets low, turkeys forage and either destroy grouse nest and/or eat the grouse eggs.
Removal of other invasive birds that compete for forage foods
Soil Conservation, please! I've hunted through areas that had no timber or significant plant growth in 20 years, from mining sites and gas well sites, and won't EVER have any normal regeneration because of the criminal reclamation standards that mining, gas well roads, and Loggers are allowed to get away with.
spraying insecticides (ticks, mites, lice)
start killing all the turkeys u can eat when turkeys started taking over the grouse left
Take them off the small game list. Lots of people. Harvest grouse while on an ATV with small caliber firearms. Treat them more like waterfowl. Work with large corporate landowners for habitat improvement and TSI.
When the DBNF was clearcutting, grouse were much more abundant. Northern states do a lot of clearcutting and they have a lot more grouse.

Appendix 2. Preferred counties for grouse focus areas on private lands.

County	Frequency	Percent
Harlan	36	4.5
Lewis	35	4.4
Rowan	34	4.3
Bell	33	4.1
Clay	30	3.8
Leslie	30	3.8
Breathitt	29	3.6
Jackson	25	3.1
Knott	25	3.1
Pulaski	20	2.5
Laurel	19	2.4
Pike	19	2.4
Carter	18	2.3
Fleming	18	2.3
Knox	18	2.3
Whitley	18	2.3
Bath	17	2.1
Floyd	17	2.1
Perry	17	2.1
McCreary	16	2.0
Morgan	16	2.0
Letcher	15	1.9
Menifee	15	1.9
Lawrence	14	1.8
Powell	14	1.8
Wolfe	14	1.8
Greenup	13	1.6
Rockcastle	13	1.6
Bracken	12	1.5
Cumberland	12	1.5
Johnson	12	1.5
Martin	12	1.5
Robertson	12	1.5
Adair	11	1.4
Elliott	11	1.4
Pendleton	11	1.4
Harrison	10	1.3
Lee	9	1.1
Magoffin	9	1.1
Mason	9	1.1
Nicholas	9	1.1
Estill	8	1.0
Lincoln	8	1.0
Russell	8	1.0
Wayne	8	1.0
Clark	7	0.9
Owsley	7	0.9
Boyd	5	0.6
Clinton	5	0.6
Garrard	5	0.6
Montgomery	5	0.6
Madison	4	0.5
Campbell	2	0.3
Total	799	100.0

Appendix 3. Preferred WMAs for grouse focus areas on private lands.

WMA	Frequency	Percent
Clay WMA	45	5.6
Redbird WMA	37	4.6
Paintsville Lake WMA	35	4.4
Pioneer Weapons WMA	33	4.1
Yatesville Lake WMA	28	3.5
Fleming WMA	27	3.4
Grayson Lake WMA	27	3.4
Beaver Creek WMA	25	3.1
Boone Forestlands WMA	23	2.9
Mill Creek WMA	21	2.6
Dewey Lake WMA	20	2.5
Hensley-Pine Mountain WMA	20	2.5
Buckhorn Lake WMA	19	2.4
Kentucky Ridge Forest WMA	18	2.3
Lake Cumberland WMA	18	2.3
Fishtrap Lake WMA	16	2.0
Carr Creek Lake WMA	15	1.9
Cane Creek WMA	14	1.8
Green River Lake WMA	14	1.8
CONSOL of Kentucky WMA	13	1.6
Robinson Forest WMA	13	1.6
Dale Hollow Lake WMA	12	1.5
Cedar Creek Lake WMA	11	1.4
Ashland WMA	10	1.3
Buck Creek WMA	9	1.1
Corrigan WMA	9	1.1
Cranks Creek WMA	9	1.1
Martins Fork Lake WMA	9	1.1
Elk Forest WMA	8	1.0
Paul Van Booven WMA	7	0.9
Shillalah Creek WMA	6	0.8
Burchell-Beech Creek WMA	5	0.6
Dix River WMA	5	0.6
Ed Mabry - Laurel Gorge WMA	5	0.6
Griffith Woods WMA	5	0.6
Miller Welch-Central Kentucky WMA	5	0.6
Marrowbone State Forest and WMA	4	0.5
Martins Fork WMA and State Natural Area	4	0.5
R. F. Tarter WMA	3	0.4
Stone Mountain WMA and State Natural Area	3	0.4
Dennis-Gray WMA	2	0.3
Ping-Sinking Valley WMA	2	0.3
Fortner-Davis WMA	1	0.1
South Shore WMA	1	0.1
Total	616	100.0

Appendix 4. Other important factors related to grouse management listed by respondents.

	Frequency	Percent	Valid Percent	Cumulative Percent
Again, this push for grouse appears to have an alternative motive.	1	.5	.5	92.7
Black Gum.	1	.5	.5	93.2
Clearcutting very important	1	.5	.5	93.7
Creating habitat for ruffed grouse, bobwhite quail, American woodcock, and other early successional species PRIMARILY.	1	.5	.5	94.2
Creating more diversity and cover for all small game species.	1	.5	.5	94.7
Giving land owners more opportunities and tools to manage their land	1	.5	.5	95.1
Grape vine habitat, north facing slopes	1	.5	.5	95.6
Grouse hunting could easily be a tourist industry here as it is in Wisconsin and other high grouse population states. South east Kentucky needs this tourism to help the economy.	1	.5	.5	96.1
Habitat Control	1	.5	.5	96.6
improved hunting	1	.5	.5	97.1
Improving nesting areas for turkey by cutting trees and creating underbrush and brush piles	1	.5	.5	97.6
Logging	1	.5	.5	98.1
Planting he right stuff for cover on strip mine land	1	.5	.5	98.5
Reducing deer herds.	1	.5	.5	99.0
Timber production and animal conservation	1	.5	.5	99.5
You are getting away from the grouse survey	1	.5	.5	100.0

Appendix 5. Other States (or Canada) Grouse Hunted by Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Canada	9	5.7	5.7	5.7
Colorado	1	.6	.6	6.3
Connecticut	1	.6	.6	6.9
Delaware	1	.6	.6	7.5
Illinois	1	.6	.6	8.2
Indiana	1	.6	.6	8.8
Kentucky	14	8.8	8.8	17.6
Maine	2	1.3	1.3	18.9
Michigan	34	21.4	21.4	40.3
Minnesota	18	11.3	11.3	51.6
Montana	2	1.3	1.3	52.8
New Hampshire	1	.6	.6	53.5
New York	1	.6	.6	54.1
North Carolina	1	.6	.6	54.7
North Dakota	1	.6	.6	55.3
Ohio	8	5.0	5.0	60.4
Oregon	1	.6	.6	61.0
Tennessee	2	1.3	1.3	62.3
Vermont	1	.6	.6	62.9
West Virginia	7	4.4	4.4	67.3
Wisconsin	50	31.4	31.4	98.7
Wyoming	2	1.3	1.3	100.0
Total	159	100.0	100.0	

Appendix 6. Free-response comments provided by respondents.

COMMENTS
A successful grouse hunt is about "body count" but it's nice to have a few points and flushes. USDA has logged/thinned hundreds of acres in Jackson, Estill and Owsley. These areas would be a great place to start habit restoration.
Appalachian grouse thrive in deep dark hollows where grape vine coverts grow slower and where timber was harvested many hrs ago and old mountain families raised corn and such back in the mountains. The remaining grouse in Ky are in or near these old strongholds of the spine of the Appalachian mountains. Grape vines grow up slowly!! Did you get that? Very important fact. Deep dark hollows, north facing slopes and grape vines with logging and or burns make super coverts.
Basically, I've quit grouse hunting in KY. We purchased a home in WI in 2008 and I save up all my vacation time to spend there, usually October and early November. Unfortunately, I don't have much optimism about grouse returning to the southern Appalachians in huntable numbers.
Close season until numbers increase. It is just stupid to keep killing what is left. You may have degrees but obviously you don't hunt or understand grouse.
Commercial logging of DBNF is what's needed.
Consider areas in western Kentucky for grouse improvement.
Cut more trees!!!
Flushing 4-6 birds a day from 1980 until 2008 then population basically crashed. Areas that should hold birds do not
Get rid of the predators the small game will return
Glad to see Dept interested in grouse. I have grouse hunted in KY for over 35 years and I never thought I would see grouse numbers so low. If cutting a section is a chosen method the cutting needs to focus of the dark sides of the hills, because that is where the undergrowth will come back. Grouse will not use cover where the sun is beaming in, very much.
Grouse are not the only thing that gets little help from KDFWR. What about a weasel native to KY ask people if they ever seen one. Yes, it's been good for the elk that gets a lot of support. How do people get drawn multiple times and guys like myself been putting in since the start with no luck?
Grouse habitat would probably end up like quail habitat, doing very little good. Could timber harvest just be another way of getting income using grouse as an alibi? Cutting our forest will do more harm in the future than good in the present. Mother nature has a way of taking care of things. Our money should be used to protect what we have, not what we might have.
Grouse hunted a lot in the 70s and 80s. Not many birds to hunt today. I would love to see #s increase for the youth.
GROUSE NEED TO BE LOOKED AT MORE HAVE BEEN DECLINING FOR PAST FEW YEARS
Grouse have declined drastically where I live the reason I don't. Hunt them I don't. Think they are enough to hunt. The grouse need help.
Hope you help the grouse population.

Hopefully the "conservationist groups" that file lawsuits against the Daniel Boone (regarding timber harvest) can understand that large tracts of mature forest with no disturbance is NOT natural! Timber harvest, herbicide, and fire would make habitat in eastern Kentucky grow leap and bounds not only for ruffed grouse but for all critters in general. Best of luck on this project and adventure!
I am a grouse hunter but due to no population I haven't hunted them since 2004. I would love to see a huntable population again
I am a Recreation and Leisure Services major at Murray State University in Murray, KY. I believe Ruffed Grouse are a very important part of the environment, and they provide great hunting and wildlife viewing opportunities. This would benefit hunters, wildlife watchers, and the economy. Grouse numbers have declined drastically in local states such as Indiana. If Kentucky makes quality Ruffed Grouse management a priority, it would set a great example for other states, and it would make Kentucky appear to be a leader in Grouse management. I would also like to see Ruffed Grouse management efforts here in western Kentucky. The 170,000-acre Land Between the Lakes National Recreation Area (LBL) provides some Grouse habitat. I believe with proper management LBL could support a healthy Grouse population one day. I believe this to be true for other areas of western Kentucky as well. Fort Campbell Military Base offers excelling habitat for Grouse in certain areas. That may be another good place to implement a Ruffed Grouse management plan one day. Thank you for making Ruffed Grouse management a priority for the state of Kentucky. A lot of hunters and wildlife watchers are very happy to know that the Kentucky Department of Fish and Wildlife is implementing a Ruffed Grouse management plan.
I am not convinced that grouse are popular enough game species that is deserving of the limited resources that kdfwr is considering using. I also think that it is a bad idea to try and relocate birds. Harvest some timber and see what happens.
I am so thankful KYDFW is showing some interest grouse. I am delighted there may be a possibility we could have grouse brought in for re-stocking because I think the current population is beyond recovery without help. Cutting timber off WMA and National Forest would be priority 1. Bring in the imported birds and release near the end of closed roads on public lands. Close the hunting season on grouse for at least 5 years (one cycle). Then when season re-opened run from 12/01-01/31 this allows all late broods to disperse in Nov and closes the season prior to drumming and breeding in Feb. When birds are spread out impact from hunting is minimized. Limit should be no more than two per day for the first three years the season is re-opened. These ideas may sound extreme however our grouse population is in extremely endangered. Please take these ideas into consideration.
I am the chapter president for the Ruffed Grouse Society (RGS) in Cincinnati, OH. RGS has biologists that can help with grouse related questions and concerns, whereas Kentucky has the land size required, and resources needed, to make an impact on grouse numbers. My advice is contact RGS and work together where possible. I will help in any way I can. I hunted elk this past fall / winter in SE KY and saw 4 grouse total and that is without my dog.
I am very pleased to see more emphasis being placed on grouse. It seems to me that the quickest, most impactful change that could help ruffed grouse in Kentucky would be if the national forest folks would be allowed to more aggressively manage their timber resources.
I began hunting grouse as a teenager in the mid 1980's, grouse were abundant and we could normally flush 20 plus birds a day even without a dog. The grouse numbers seemed to hold steady for the 1990s but in the early 2000's the numbers began to drop each year until I finally felt the numbers were so low that I completely stopped hunting grouse around 3 years ago even though I have very good dog. I hunt in Harlan and Bell County and the timber industry has been booming for the last 10+ years. Nearly every place I hunt has been completely logged and the grouse numbers continue to decline in spite of the logging. I deer and turkey hunted an estimated 15 days last year and probably didn't jump

3 or 4 grouse the entire time. Predator numbers are a problem as well as over hunting by the guys who don't work and hunt every single day --- shorten the season and restock the grouse --- the logging isn't helping!!
I believe more habitat can help but in our area we still have enough habitat to hold some birds. I don't shoot birds here anymore but I still am in the woods chasing woodcock in the same places we use to find grouse but in the past five years or so grouse have disappeared which leads me to believe we have some kind of disease. I also believe grouse can make a quick comeback, I have hunted a lot up north and numbers can be terrible a few years then bang, a great year. I know they cycle more there but if they have favorable conditions and habitat they can populate pretty quick. We have to concentrate on the prime areas and see if it's possible to get the population on the upswing, which looks like is in the plans. I really hate the thought of disease but I can't believe habitat and hunting pressure in my area would cause such a decline in numbers.
I enjoyed grouse hunting a young kid and teenager. Being the father of 2 young men I hope they can someday enjoy it as well. In the current situation It is very hard to get them to hunt with the possibility of not even getting a point in a day of hunting. The interest of our young people in hunting continues to decline. Thanks for all your work and I hope something can be done to save the "KY Grouse."
I fully support ongoing efforts to manage grouse habitat. That should be the priority for grouse mgt. However, I think more grouse hunting opportunity could be provided in the short term if Fish & Wildlife had a public access program to provide public hunting on private land parcels that have recently had timber harvests. There will always be more timber harvesting on private land compared to government owned public land due to government restrictions so the best grouse habitat will likely always be on private land. Providing access to this land will benefit hunters in the short term while WMA's and the National Forest should be managed as much as possible for long-term sustainability of grouse and other wildlife.
I grew up grouse hunting in Bath County, Kentucky and have long been concerned about the decline in grouse numbers. I have not hunted grouse in many years but would like to see the numbers improved to afford that opportunity should I take it.
I hate to say it, but I think this grouse initiative is a waste of time. The Daniel Boone National Forest and the Corps of Engineers are not going to cut enough timber to make a difference. Having them attend meetings is a waste of time. The forest products industry in east KY is too weak and small to support the scale of timber harvest on private land that is needed to make a difference.
I have been grouse hunting for 30 years in the last 12 to 15 years grouse numbers have gone down to nothing in pike county where I live and hunt the most. Please consider doing something here before our birds are completely gone. Thank you.
I have been pushing for help with the declining grouse population since around 2000 when they declined to nearly nothing. I'm very hesitant to be involved with anything kdfwr is involved with as a result of the ignorance that has been shown in the past. This is far from a new problem, in fact the dept has let it go so long without intervention that it may be too late to ever recoup our small game populations back to semi healthy.
I have grouse hunted for 40 years. It seems like when the turkey and coyote population increased the grouse decreased.
I have grouse hunted since 14 years old & have seen a steady decrease in grouse population. Thank goodness someone has recognized we have a problem. I would have loved to teach my grandson to grouse hunt but it’s hard when you hunt all day & don't flush a single bird. Thank you.
I have Grouse hunted since I was 10 years old in Kentucky and the numbers have gone way down here. Now days you’re lucky to see one grouse after and all day hunt. I hunt in the Bell county area.

I have hunted my entire life in KY and other states. Grouse were very abundant in my early years and teens in which I would jump grouse almost every time I was in the woods, but like everyone in Pike county we have noticed a decline in numbers. As a scientist and avid outdoorsman I am unclear of the cause. Our deer density is not high and we have a diverse age structure on timber which does not appear to have a significant impact on numbers. I find most of my grouse in the same locations I have hunted my entire life without change in habitat. I also hunt a number of clear cuts of varying ages. I do believe it is some way related to the number of predators with the increase coyotes and other furbearers given our reduction of hunters and trapper numbers Which continue to decline in our region which is concerning given the numbers when I was a boy. Our habitat is better now given the edges and feed of our strip jobs and clearcuts but the grouse numbers do not seem to increase accordingly. I can't help but notice the inverse relationship between turkey numbers compared to grouse? I would like to hear your thoughts to this please
I have never hunted grouse but would love the opportunity to.
I have noticed the decline in grouse numbers throughout the years but this past year I seen more grouse during the summer then I have in a long time. I even had a first in seeing a mother with nine little ones. And also seen four bobwhite first I have seen in five years or better. All were seen on top of black mountain in Letcher county on a reclaimed strip job.
I have quit hunting grouse because they are not enough of them left to hunt. Habitat reduction may be one factor but over hunting is the main cause. Ky has a longer grouse season than rabbit season and has the same bag limit. Do we have as many grouse as rabbits? The February season needs to be cut out completely because the grouse gather lower down in the hollers for mating and are easier to find and harvest. Every grouse hunter I know blames the reduction of grouse numbers on turkeys saying the turkeys eats the grouse eggs and the food supply of grouse. None of the grouse hunters will leave any grouse for seed, if they know there is one grouse somewhere they will keep hunting until they kill it and they all have the motto 'if I don't kill it somebody else will.'
I have seen ring neck pheasants in Daviess county and would like this bird and quail populations increased.
I hold a BS degree in Science, as does my brother, who has an AOC in ecology/environmental science. We've hunted together, with our dad and our dogs since I was 14yrs. old.....firstly.....THERE ARE LITERALLY NO GROUSE NOW! I put this in all caps because I feel like it should be surveyed (drumming reports), confirmed, and studied. I believe that some years back, a combination/culmination of factors contributed to wiping out all of the "seed" birds in areas that always had an old "hold out" crazy-wild seed bird that kept the overall population just barely hanging on enough to keep 'em going across big acreage. The populations steadily declined, just like the graphs show, throughout the 90's until about....I can't remember the exact years... (10 or so years ago)....we had 2 consecutive very cold, very long winters. The season just prior to the 1st of these 2 consecutive years, I remember that the birds were at the bottom of their natural population cycle, and hunters were having good enough late season weather to kill some FEB. grouse, (when they are easiest), but everyone said the numbers were abysmal, and we killed practically none. Later in that summer, I'd be driving down the Interstate in the warmer months, and would see crows and other birds walking out into traffic to be hit by cars, and crows, particularly, were dying everywhere around here. I had dead warblers on the porch. So many crows died around here, that the old "watch crows" died and didn't pass on their paranoia to the young birds when they finally rebounded, and now you can approach them in the backyard on foot, whereas before they'd fly if you looked out the window at 'em. It's kind of oddly creepy. Was it West Nile virus that killed these crows and other birds, and if it was a mosquito borne disease that killed this huge mass of birds, DID this virus/disease contribute, along with poor brooding cycles, and hunting pressure, to kill the "seed" birds off to the point where they are practically extinct, for THOUSANDS of acres, where before, you might hunt all day and find 1 or 2 on a good day, now you will hunt those areas 3 times and find none! Not one. There are no signs, feeding, feces, nothing! I think the dept. must already be aware of this, considering "re-stocking" efforts from Wisc. And I fully agree, from a scientist point of view, that it will take at least that kind of effort, over areas that are geographically close enough

for stocked birds to "link" genetically, and a full longitudinal study to have any hope of bringing the population back to the glory of the 70's and 80's that the older guys like dad hope for in their lifetimes, and I can only dream of. Of all of the hunting in KY or any other state that goes on, the guys who own and train dogs, like we always have, bear the biggest burden of financial expense for animal conservation. We've made the northern state hunting trips, and it costs a lot of money, just as it always has to hunt birds in Ky. I think that many bird hunters care deeply about conservation of not only the game, but the land to a fertile state that will support natural succession of ecosystems and plant diversity. Now, as to seasons and bag limits, I'd be the first to say that we have in our area some very "greedy" hunters who never wanted to drop Feb. from the calendar or decrease bag limits, while I fully supported that measure, and future efforts to "restore" (because that is what it is at this point) grouse populations must include a FULL CLOSE of season after re-stocking. I understand that you want "study" areas, but you'd practically have to stand guards full time with some people. Still, it is a more than worthwhile challenge. Even if the efforts do not yield quick rewards, we might learn some crucial things that we didn't know, and those factors might make long term efforts truly viable. I could write a dossier of theories and personal accounts on this subject, with at least some survey evidence to support my claims. In this short (ha ha) comment, all I can say is that I've seen only 3 different grouse in all of the hunting I've done (including deer) in the past 6-7 years. I listened to one drum last fall, deer hunting, for all day, and DID NOT even consider going after him come season. I thought it was sad that he drummed for hours with no respondents. In summary: IMO, right now "seed bird" loss has been an insurmountable obstacle for grouse over the last decade, as have VERY POOR efforts on the part of commercial mining reclamation, gas well drilling roads and sites, and logging operations. Thinning timber is good, good, good, BUT these roads leave behind massive soil loss, and scarred land that will never regenerate plant growth or timber. The WRONG species of plants are the only ones that will grow, if any do, in that poor soil left behind. In turn the land doesn't naturally succeed in a diverse way, opening the door for invasive species. Hunting pressure is down the past couple of seasons on grouse, because there aren't enough for even the greediest hunters to waste time looking for. But the bag limit should be 1/day w/a short season (no season at all if I had my way) until success of restoration can be reasonably assured. I can tell you right now, the hunting is so poor, that if you told me, I could go out and flush 2 birds/day, and take 1, every time I went hunting right now in Ky, I'd be happy with that. Contrast this statement to my dad/uncle's accounts of driving 1/8 mile from the house, and killing a limit of grouse from 4pm-dark in the late 70's early 80's, in Jan. Like I said we've hunted some high grouse density woods for week long trips up north, and dad says that the hunting, the quality of hunting up there isn't (even in the good spots) what it once was right here at home, in those days. What an opportunity missed for sportsmen and tourism economy. The northern states make millions every year on their small game "trippers", while we've bled jobs and coal severance dollars. Timber is coming back, but loggers are destroying a lot of land, permanently. Coyote populations, as well as bear, seem to be at all time highs around here, though, as do the most common predator avian species. Old mining lands create "higher than normal" predator bird populations, in my view. Hawks have no natural controls, and an increase in rodents with all of that scarred up strip land. Removing the last of the "high walled" coal seems, and completely flattening the mountains has had negative effects, too. The Daniel Boone forest area is over grown, but has the distinct advantage of natural "grade", elevation, and high vegetation. You'll find more birds in that country, though few still (disease?) than you will on private lands adjacent to mined lands. I'd say around the Redbird WMA, might be a suitable study area, as would the roughest areas around Cave Run, but the study areas should really, also include more representative areas that national forest lands. How can the overall success of the program be established by limiting the restoration areas to lands that are only largely undeveloped and unchanged? The effort has to include studying areas that ARE changed, that are altered permanently, to determine what therapies can be applied to improve these lands, which are the vast majority of lands. But we're ready to help. I applaud the department for taking up this cause. Deer can live anywhere, but grouse are like the canary in the coal mine, in my view. Go grouse, go quail!

I hunted grouse from the early 1980's until 2007 or so when the numbers were so low I didn't feel it morally right to kill them. I have seen two grouse on my land in two years and maybe 2 on DBNF which is the most I've seen in many years. I don't even hear spring drumming anymore. My English setter passed away last spring from old age and maybe a broken heart and I haven't considered training a new pup. I hope the grouse are not gone for good. We do have plenty of hawks, owls, bobcats and coyotes. But I do understand habitat is the key. I saw a brief upswing in numbers of grouse in areas hard hit by the 2003 ice storm. A problem we have here in the Natural Bridge Area is development of prime covers into vacation/tourist cabins sites, etc and the resulting loss of hunting access. It's a complex problem that's not going to be easy to fix. The best chance for logging would be on the WMA's. The main block of the Robinson Forest had good grouse numbers in the mid 90's when I worked there. They later did some major logging there, did grouse numbers respond? Thanks for your efforts,
I just moved to KY in fall of 2013. I can from MN and hunted grouse over 30 days per a year. I would love to help and learn more about building the grouse numbers here and where to go. I rep and sell advertising for Ruffed Grouse Society Organization.
I live adjoining Pennyrile State Forest, in Christian Co KY. There is no game management practiced on this 15,000 acre tract. Management consists of 1 2 day quota deer hunt each fall. We are victims of the massive ice storm of 2009. There is potential for grouse production on this area, but it will require funding and hands on management. Now hunters simply harvest game that balances itself, with no real management on the part of man. Put nothing into it, that's what you will receive from it. You asked, now let's see what we can do to improve it.
I own several acres in Shelby county and would love to work with KDFW to try a grouse release and see how it goes.
I probably would not hunt grouse myself but would support the initiative to help increase grouse population for others to do so.
I still see grouse but not much in the last few years since coyotes got so plentiful
I think that the Dept. of Fish and Wildlife should help supply loggers with some kind of seed to sow on logging road for food
I think that this is great, but I worry grouse numbers are so low in our state that they may never recover. Birds can't even be found in good cover.
I used to be an engineer for a coal mine in Harlan county. I would consult with various people of what to plant to enhance the grouse population.
I would love to get involved with a restoration program for grouse in the state of Kentucky, especially in areas close to my home town. I know that habitat improvement is the only way that we can get the Ruffed Grouse to stay and multiply here in Ky. Thank you for your continued support for the welfare of small game in the Commonwealth.
I would love to see some effort put to the grouse population in Kentucky. Any more, hunting grouse in Kentucky seems to be nothing but a frustrating hike in the woods with my dogs. Michigan and Wisconsin is where the hunting is good. I would love to be able to show my young kids one day what a grouse looks like in Kentucky.
Improve habitat. Promote trapping and predator hunting. This will help grouse more than anything I can think of.

In my area, there are many times more predators now than when grouse numbers were fairly high.
It has been sad to see the grouse numbers in KY continue to decline year after year. I didn't even bother taking my dogs out in the KY woods this due to lack of flushes the past few years. Some of the older guys that I hunt with always talk about how good KY used to be in the 60's & 70's and I feel like my generation is missing out on those same good times. I hope that the state is successful with this plan so that maybe future generations may enjoy what is one of the greatest hunting experiences there is. The sound of a grouse busting out of thick cover provides a lasting memory.
It will be impossible to improve grouse numbers, even with good habitat improvement unless the hunting season is not continued past December 31. Only if grouse numbers begin to rise significantly in focus areas should the season be extended, but never past Jan 15. As far as wild grouse stocking is concerned, the season should be closed in those areas until grouse populations reach levels that would allow trapping and restocking and never less than 5 years.
KDFWR is doing a fantastic job with small game management efforts.
Most hunters including myself are ready to give up on grouse hunting in Ky. There has been a tremendous decline in the grouse population in recent years. Most hunters believe that this falling away is due mainly because of predators, diseases, and habitat. We feel that KDFW is a little late in their efforts to correct this problem.
My personal opinion on declining grouse population is a combination of many factors such as more predators than ever in the history of Ky (bobcats, coyotes, hawks, owls) more turkeys and deer competing for food, more insect infestation, too many four-wheelers in forest.
Need more focus on threatened native plant species ASAP
Need to restrict hunting off four wheelers.
Needs to b more focus on habitat and more help for individual who want to improve habitat on private farms that would protect birds for a sanctuary that would help restore population
No point in asking laymen about focus areas and acreage requirements. We're not trained in that. We can however give you boots-on-the-ground data. I've been lax about filling out the survey in the past and that is my fault, no excuse, but it gets danged depressing putting it on paper. Also, I'd like to see a focus on private lands since that's the huge majority of land in E. Ky. We have to somehow bribe landowners to start cutting and cutting hard, get rid of the maple and beech that is becoming dominant the species. And Thank You for giving our grouse some attention. I appreciate it.
Open up DBNF to logging again!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Please give this effort the time and resources needed to be successful. I fear that it may be too late already.
Please stop logging on public lands. I do not believe this is the best way to restore habitat for Grouse. It only damages habitat for other species including white tailed deer, turkeys, predators, squirrels, and other game animals. Logging is also an eyesore and destroys places that were once beautiful. It also destroys places that were once easily accessible to hunt. For example, on Clay WMA several acres of hunting land have been destroyed by logging. It is impossible to drive on the upper unit without seeing the destruction that has been done. Several of the areas that have been destroyed by logging are areas where I have hunted in the past and am no longer able to access good hunting lands from the road. While I do believe that it is important to make efforts to restore the grouse population, destroying forests is not the best approach.

Predator control, turkey control, commercial timber harvest, logging of Daniel Boone and other large acreage sites are essential to giving these birds a chance.
Really grouse???????????????? What's next dinos? Let's work on what we have now.
Really impressed with the effort so far. Having hunted in many states, u can tell the ones that manage the habitat for game. Keep up the good work, like the commissioner said it will take years, but I truly believe my kids will be able to grouse hunt!
see a few grouse every time I am out here at home
Seems as though you are concentrating efforts on habitat, I'm not so sure that's the problem. Seems as though as the turkey population increases, grouse population decreased, coincidence? I don't know. But I know we still have plenty of habitat here where I live, just no grouse.
Select harvest of mature growth is important to me
Thank you for your conservation efforts on the behalf of Kentucky citizens.
Thanks!
The are vast areas of Dan Boone National Forest which choked with deadfalls, invasive, plants, and subject to very poor forest management. However, in those areas in or adjoining Big South Fork National Recreation Area a great deal has been done to provide meadow areas with native grasses, wildflowers, etc. As well, areas of deadfalls and tree damage due to ice storms etc. have been cleaned up, leaving an appropriate amount of brushy areas to provide cover for wildlife, and yet provide the ability for movement by both wildlife and people. You see a great many grouse (or hear them) in these areas. Adjoining areas such as Rock Creek are so tangled and damaged in the understory that you rarely see or hear grouse or other wildlife, though they are present, just in fewer numbers than they are a few thousand feet away in areas bordering BSF. I believe cooperative effort between the USDA and KDFWS to clean and better care for these areas would greatly improve wildlife habitat and numbers within Dan Boone National Forest.
The deer herd in Boyd County is out of control. They strip the forest bare, make it impossible to grow food for your family, and make the roads extremely dangerous. They eat the native plants to the ground and only leave invasive species. The best way to protect habitat for other species is to severely thin the deer herd and reestablish native plants.
The department should abandon a rigid native plant policy, especially when dealing with reclaimed surface mine areas. Anyone who has studied ruffed grouse nutrition and cover requirements knows the benefit/necessity of quaking aspen. Likewise, Asian crabapple species, although nonnative, do provide spring buds and fall fruit, are fast growing and relatively small. Moreover, they grow well in poor soils, such as reclaimed surface mine. Should habitat patches be considered in grouse focus/study areas, I would encourage the planting of these two trees.
The grouse season is too long, it should end on January 31
There is a great need for doing more to promote timber harvesting or cutting trees in general as a positive activity when done correctly. I suspect if you survey the public at large you would find the majority of Kentuckians see cutting trees as a detriment to wildlife. The establishment of grouse focus areas is a great idea. This will be the place where KDFWR can demonstrate and promote the connection between active early succession forest management and a positive grouse population response. It will work!

There is so much potential for this bird to thrive just like in central to northern Minnesota and all of Wisconsin across the whole state, especially heavily pined areas.
Transplanting grouse from WI sounds like a great idea once habitat improvements are completed in a controlled area.
We have been seeing a steady decline of Grouse on our farm for the past 15 years. between 2000-2004 we would flush 6-8 birds in a morning, from 2005 to current it has dropped below 1 flush per hunt,
We have hunted in the Daniel Boone National Forest at the tailwaters of Cave Run Lake on Caney Creek for over 30 years. About 10-15 years ago, hunting was good. It seems that the introduction of wild turkeys and their increase, that the grouse have been scarce. Have you considered the destruction of grouse nesting on the ground by wild turkeys that forage through the forest bed and destroy the nests? I am encouraged by your attention to this problem.
We used to have many grouse on the farm I hunt in Robertson County a few years ago. I haven't heard or seen a grouse for the past 3 years.
We would like to be a part of this project. We have 300 acres in Clay County, and want to help wildlife for observation.
Where I live in Carter Co. we used to have lots of grouse, but I have not hunted the last few years because of the very low numbers of birds.
Why have the last 2 major game/habitat restoration projects taken place in the far eastern half of the state?
Why is there still a grouse season at Ft Knox? There hasn't been a grouse seen there any the last 15 years.
You've waited too long to get interested in saving the grouse. That being said, if grouse were thriving, they couldn't survive in much of the Daniel Boone for lack of habitat. Also if you try to bring in birds from other states I fear most will die in transit. I hunt private land where there are thousands of acres of good habitat and there are almost no grouse there either. What birds there are haven't been reproducing. I don't think it can be blamed on predators. If any predator is a contributor to the decline of grouse it would probably be the Cooper's Hawk. I think it's more of a disease problem or something to do with the environment. Pollution, acid rain, I don't know, but my guess is disease. I would love to see numbers like we used to have but am very skeptical that anything can be done. It's a shame.